

# **Activity Based Mathematics Learning Grade 7**

**Mathematics Branch  
Ministry of Education**

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Activity Based Mathematics Learning  
Grade 7

Ministry Of Education  
Mathematics Branch

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# Introduction

Mathematics is an Universal language. The intention of teaching Mathematics in school curriculum has a countless Goal. One specific goal is to develop skills in the use of verbal, written, metaphorical, graphical, real, and algebraic techniques and thereby improve precise communication skills. Mathematical activities play an important role to develop the usage of oral, written and pictorial method in mathematical concepts.

The subject matter set in the Mathematics curriculum mostly relates to real-world experience. Hence, it is also important to give students the opportunity to understand the concepts of Mathematics in a simple, practical way, by connecting them to practical requirements of day to day life. The concepts that are understood through the combination of Mathematical language are verified by the actual exercises achieved by the students.

The activities given in the book of “Activity Based Mathematics Learning Guidance” is based on these processes. Also, it helps to ensure a student centered teaching learning process in the class. The activities of this book are prepared according to the “Teacher’s Guide” and the “Text Books”. Further, it is expected to develop skills such as the creativity, problem solving ability and methodical finishing. Further the activities facilitate a friendly atmosphere in the class, allowing students to build up good relationships.

This book introduces Mathematics through lot of group of activities, that can be done in the classroom. Since, students in the class have different skills and abilities. Then need to be addressed according to their levels of understanding. The research finding prove that, the activity based learning is the key to develop interest in learning Mathematics. Therefore, we believe that “Activity Based Mathematics Learning Guidance” will greatly help the Mathematics teachers, in achieving that objective

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# 1

## Bilateral Symmetry

**Competency 25 :** Observes the beauty of the environment exploring the properties of various shapes

**Competency Level 25.1:** Engages in creations while examining the properties of symmetric plane figures

### Learning Outcomes-

- Identifies plane figures that can be folded into two coinciding parts as plane figures with bilateral symmetry.
- Draws the axes of symmetry of a plane figure that has bilateral symmetry.
- Accepts that a plane figure with bilateral symmetry has at least one axis of symmetry.
- Finds the number of axes of symmetry of a given plane figures.
- Draws plane figures with bilateral symmetry on a square ruled paper.
- Creates plane figures with bilateral symmetry using various methods such as folding papers and cutting them, using paint etc.

### Idea to the teacher

Symmetry is a geometrical concept constructed on plane figures. A plan figure is known as a symmetrical plane figure, if the figure can be divided into two equal parts by coinciding the two parts along the folded line. This folded line is known as axis of symmetry. Grade 07 lesson enables students to identify symmetric figures from and create symmetric figures using various methods.

### Learning Outcome

- Identifies plane figures that can be folded into two coinciding parts as plane figures with bilateral symmetry.

An activity related to this is given below

Refer page numbers 35, 36 in grade 7 Teachers' Guide

### Activity 01

### Quality Input

- 5 Copies of the activity sheet in annex 1.1.1 for each group.
- Copies of activity sheet in annex 1.1.2 for each group.
- Glue
- Scissors

## Teachers' Role

- Engage the students in activity 01 on page 2 in grade 7 text book.
- Group the students appropriately into 5 groups and distribute the quality inputs to do the activity in annex 1.1.1.
- Ask the students to cut and separate the figures in annex 1.1.1.
- Enlarge one of the figures in annex 1.1.1 and show the students how to coincide the figure by folding it.
- Explain the meaning of "Coinciding".
- Ask the students to separate the figures into two groups as figures that can be coincide and figures that cannot be coincide, by folding the figures.
- Ask the students to paste the figures that can be coincide in annex 1.1.2 such that pasting one part. (the other part can be opened)
- Ask the students to present the whole figure also in their presentation.
- Let the students present their findings.
- Lead a discussion after the presentations and display the symmetrical figures in the class.
- Engage the students in activity 2 on page 3 in grade 7 text book.

## Students' Role

- Engage in the activity according to the instructions given by the teacher.
- Present your findings to the class and discuss about it with the other group.

## Learning Outcome

- Finds the number of axes of symmetry of a given plane figures.

An activity related to this is given below

Refer page numbers 35, 36 in the grade 7 Teachers' Guide

## Activity 01

### Quality Input

- 5 sets of the figures in annex 1.2.1
- Five copies of activity sheet in annex 1.2.2.
- 5 felt – tip pens.
- 5 scissors.

### Teachers' Role

- Separate the students in to 5 groups and distribute activity sheets in annex 1.2.1 and 1.2.2 and other quality inputs.
- Instruct the students to cut and separate the plane figures in 1.2.1.
- Instruct the students to draw the axis of symmetry of each figure using felt tip pens by coinciding them. According by ask them to complete the activity sheet 1.2.2.
- Provide opportunities to presentation of the group discussion according to the presentation.
- Engage the students in exercise 1.1 on page 4, 5 in the text book

### Students' Role

- Engage in the activity according to the annex 1.2.2

An activity related to this given below

### Learning Outcome

- Draws plane figures with bilateral symmetry on a square ruled paper

An activity related to this given below

Refer page numbers 36, 37 in the grade 7 Teachers' Guide

### Activity 01

#### Quality Input

- 10 cm x 7.5cm mirror card and an activity sheet for each student. (annex 1.3.1)

#### Teachers' Role

- Give a mirror card and an activity sheet (annex 1.3.1) for each student.
- Cut pieces of cardboard with measurements 10 cm x 7.5cm and paste them on a mirror paper (Reflective paper). These can be used as mirror cards.
- Give instructions to keep the mirror card along the line AB in each figure in the activity sheet, such that the reflection can be seen through the reflexive plane.
- Give instructions to observe the way the reflection occur and complete the figure with the bilateral symmetry.
- Engage the students in the exercise 1.2 on page numbers 10 and 11 in the text book

### Students' Role

- Engage in the activity according to the given instructions. (annex 1.3.1)
- Engage in the exercise 1.2 on page 10 in the text book.

### Learning Outcome

- Creates plane figures with bilateral symmetry using various methods such as folding papers and cutting them, using paint etc

An activity related to this given below

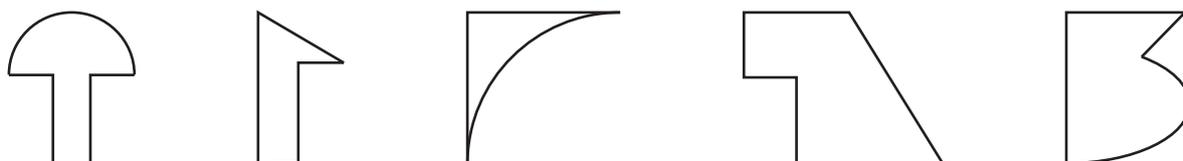
### Activity 01

### Quality Input

- Activity sheet (annex 1.2.3)
- Scissors, Glue
- Demy Papers
- Box Board

### Teachers' Role

- Group students consist with 5 students in each.
- Paste the shapes given below represented in annex 1.2.3 on a box board and cut them. Give these 5 shapes for each group.



- Distribute demy papers and appoint the students to construct symmetrical figures using the above shapes as blocks.
- Let the students draw different symmetrical figures as much as possible using only one shape.
- Engage the students in constructing symmetrical figures using the above 5 shapes.

### Students' Role

- Distribute the shapes among the members in the group
- Draw symmetrical figures using given demy papers
- Name symmetrical axis of them.
- Find the shape that can be drawn maximum number of symmetrical axis and present to the class

Group 1

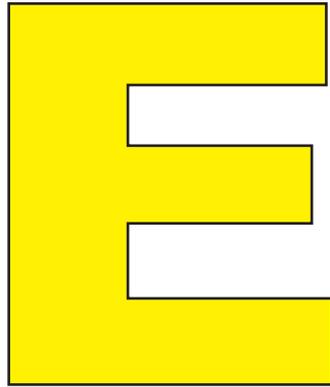


Figure 1

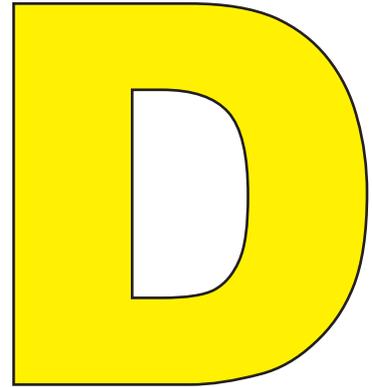


Figure 2

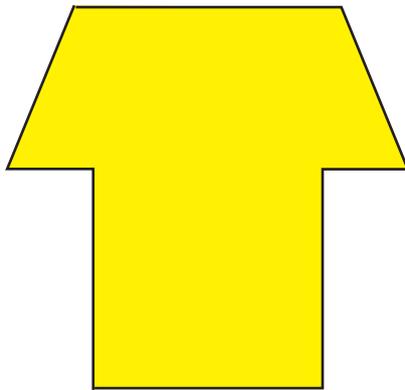


Figure 3

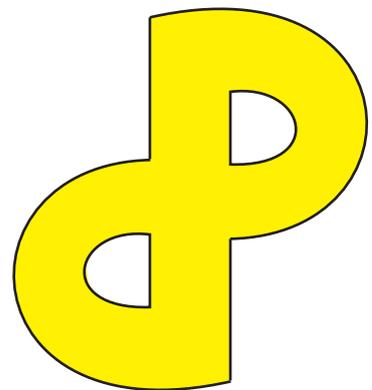


Figure 4

Group 2

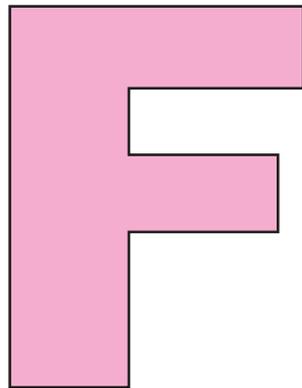


Figure 1

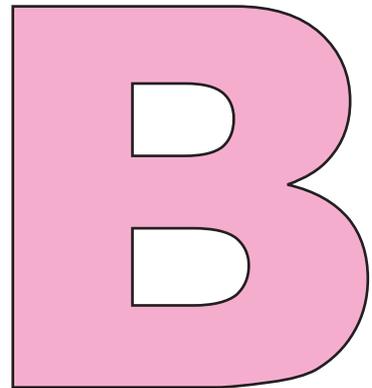


Figure 2

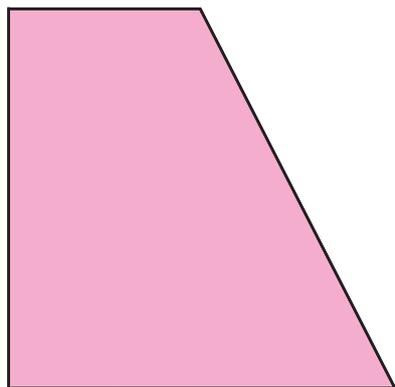


Figure 3

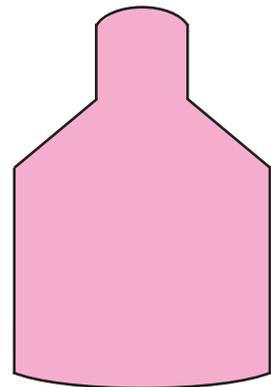


Figure 4

Group 3

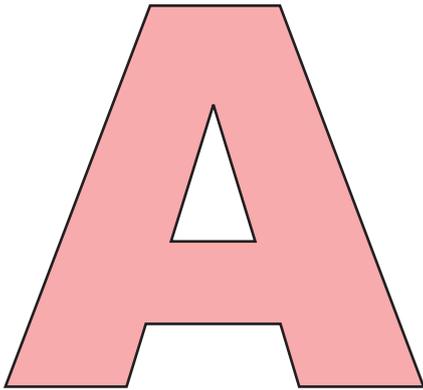


Figure 1

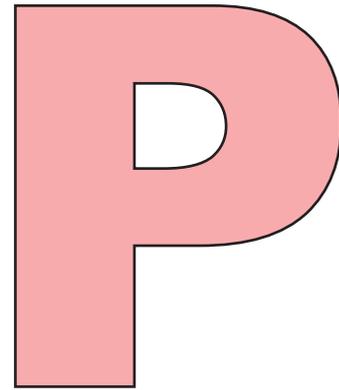


Figure 2

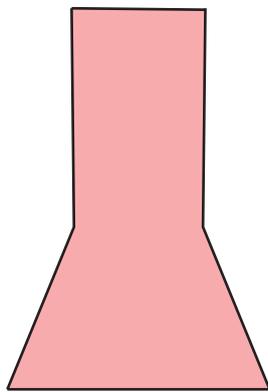


Figure 3

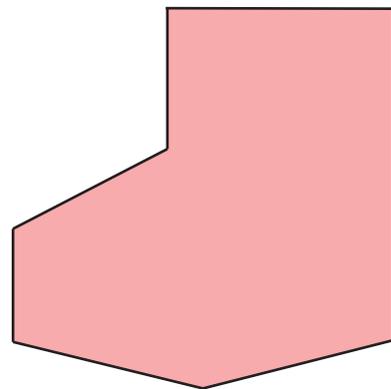


Figure 4

Group 4

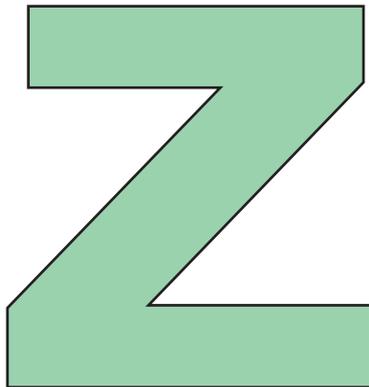


Figure 1

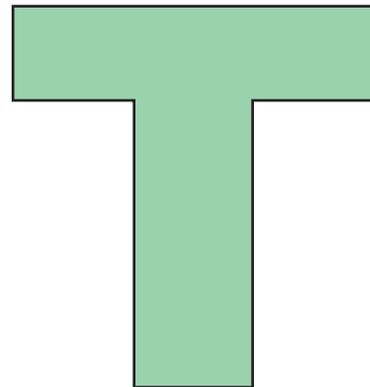


Figure 2

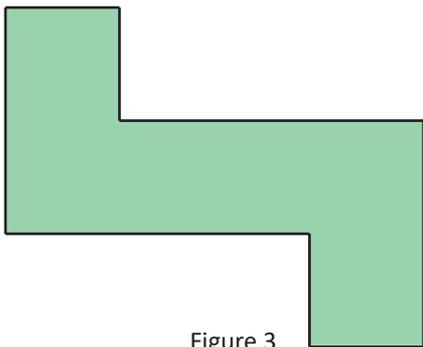


Figure 3

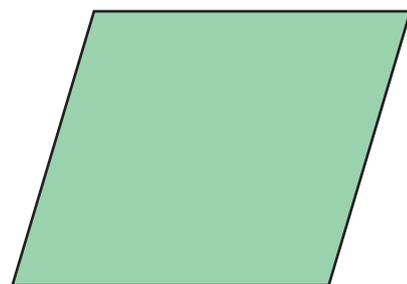


Figure 4

Group 5

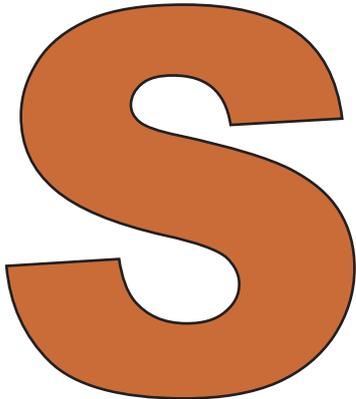


Figure 1

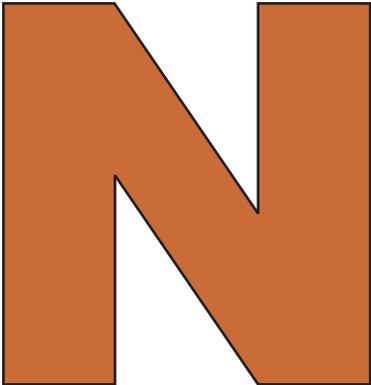


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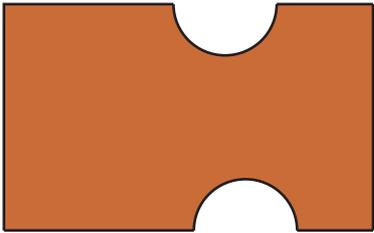


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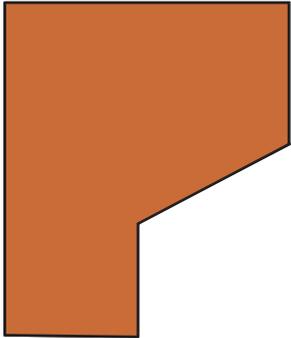


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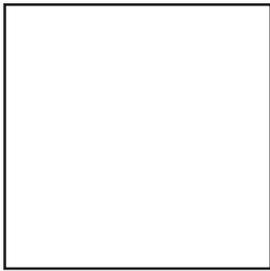


Figure 1



Figure 2

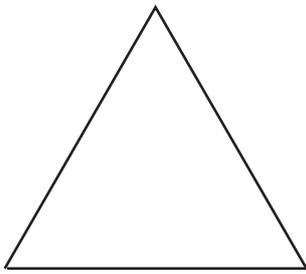


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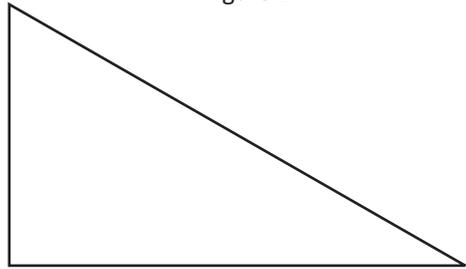


Figure 4

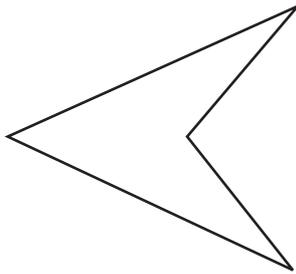


Figure 5

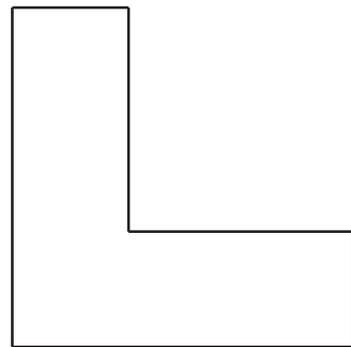


Figure 6

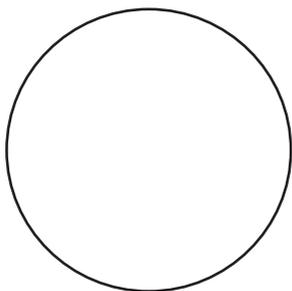


Figure 7

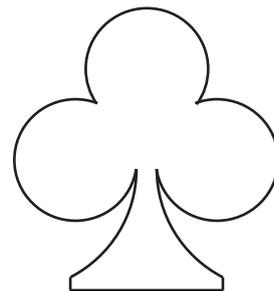


Figure 8



Figure 9

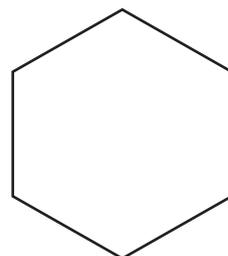
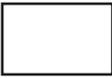
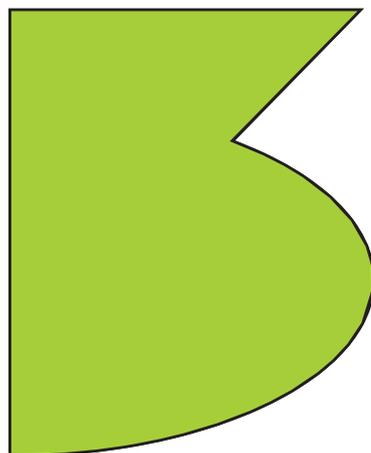
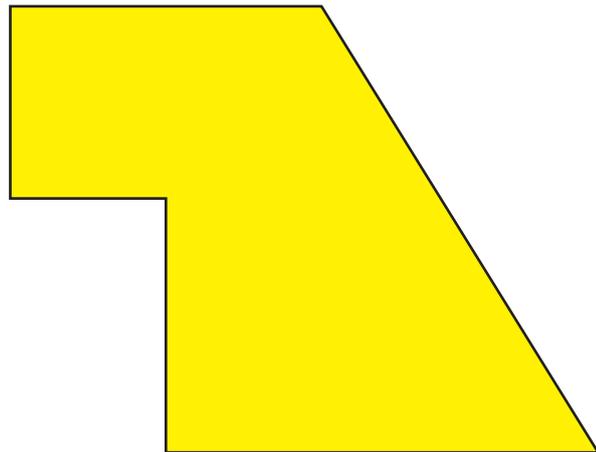
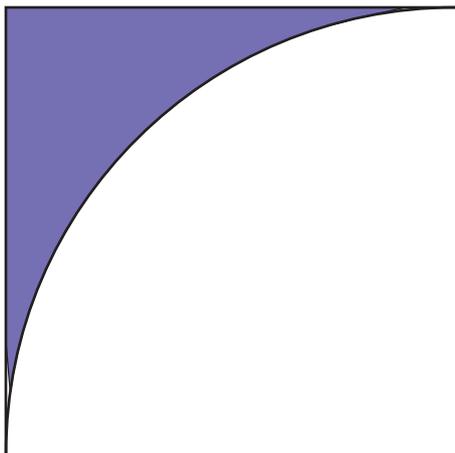
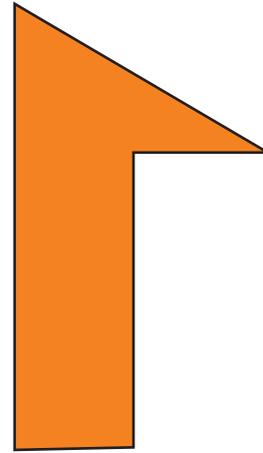
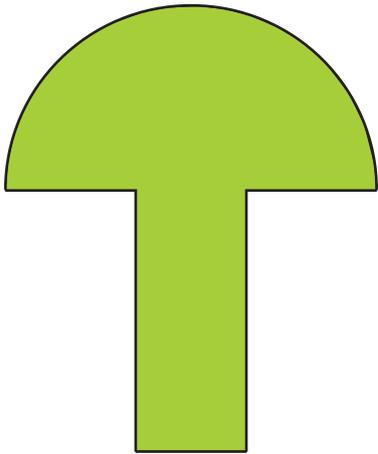


Figure 10

### Activity Sheet

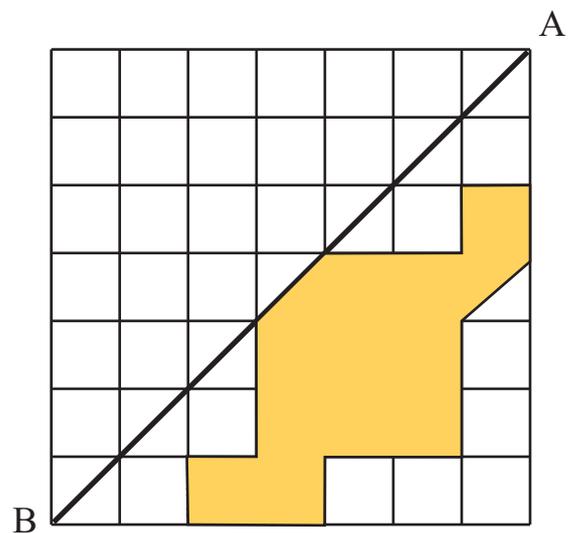
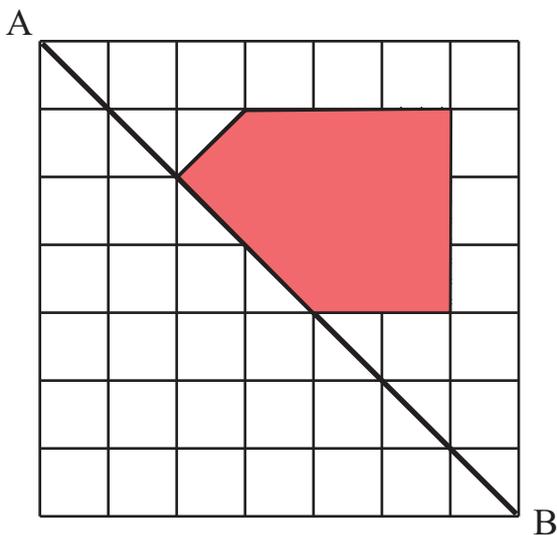
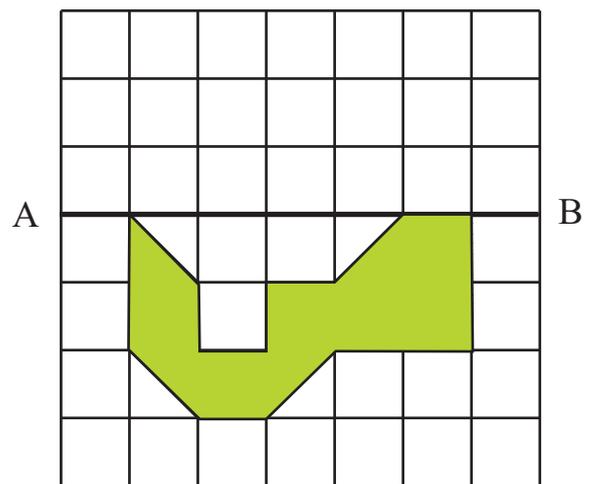
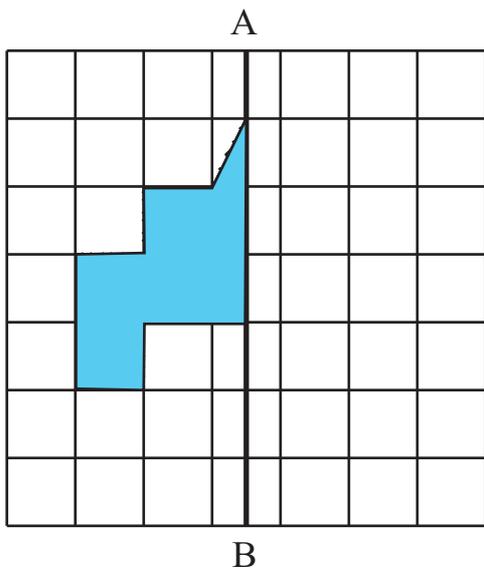
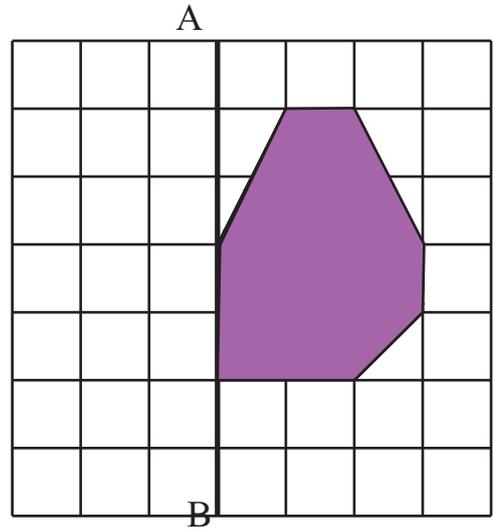
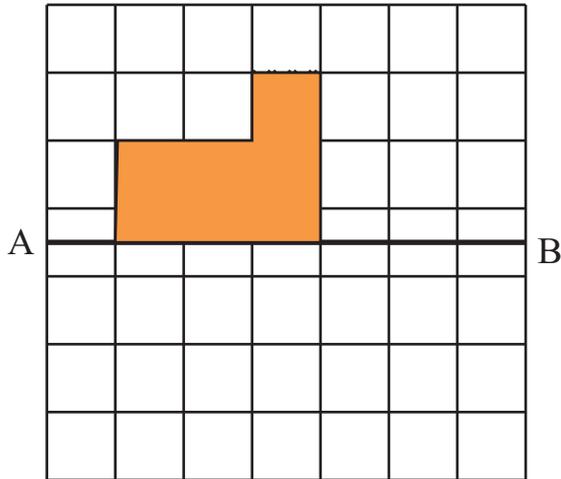
- Cut the plane figures from the given paper.
- Find out whether each figure is bilaterally symmetrical or not.
- Draw all the axes of symmetry on the symmetrical plane figures.
- Complete the table given below accordingly.

Figure		Have / Have not Bilateral Symmetry	Have	Number of axes of symmetry
Figure 1		Yes		4
Figure 2				
Figure 3				
Figure 4				
Figure 5				
Figure 6				
Figure 7				
Figure 8				
Figure 9				
Figure 10				



### Activity Sheet

Complete each plane figure given below by keeping the mirror card along dark black line and observing the reflection



## 2 Sets

**Competency 30** : Manipulates the principles related to sets to facilitate daily activities.

**Competency Level 30.1:** Identifies groups with common properties as sets and represents them by various methods.

### Learning Outcomes:

- Describes a set as a group of items that has been specifically defined
- From a collection of groups, selects and names those which are sets.
- Describes the items in a set as the elements of the set.
- States what the elements of a given set are.
- Accepts that a closed figure can be used to represent a set.
- Identifies the closed figure that is used to represent a set as a Venn diagram.
- Represents a given set by a Venn diagram.
- Represents the elements of a given set in a curly bracket.

### Idea to the teacher

In the theme sets and probability in mathematics, the numerical problems related to groups (sets) can be solved easily and methodically. In the lesson 'selections' in grade 6, grouping according to the common characteristics and naming those groups are represented. In grade 7, those groups are introduced as sets and the standard ways of representing a set are introduced

### Learning Outcome

- Describes a set as a group of items that has been specifically defined
- From a collection of groups, selects and names those which are sets.

An activity related to these is given below

## Activity 01

### Quality Input

- An enlarged activity sheet in 2.1.1 on a demy paper
- Copies of annex 2.1.1
- Scissors
- Glue

### Teachers' Role

- Group the students appropriately and distribute quality inputs.
- Ask each group to cut and separate the figures in the paper they received.
- Instruct them to separate the figures into three groups considering their common characteristics.
- Ask them to past the figures separately inside the circles in the activity sheet ( annex 2.1.2)
- Give instructions to suggest a name for each group by giving reasons.
- Lead a discussion according to the group presentations.
- Engage the students in the exercises 2.1 on pages 13, 14 of the text book

### Students' Role

- Engage in the activity according to the instructions
- Complete the activity sheet in annex 2.1.2
- Present suggestions to the class and discuss with other groups

### Learning Outcome

- Accepts that a closed figure can be used to represent a set.
- Represents the elements of a given set in a curly bracket.

An activity related to this is given below

## Activity 01

### Quality Input

- A set of letters of the English Alphabet for each group.
- Copies of the activity sheet in annex 2.2.1
- Bristol boards
- Felt pens / pastels

## Teachers' Role

- Group the students appropriately and distribute the quality inputs.
- Engage the students in the activity.
- Explain the students that by the third step of the activity sheet, elements of each set are mentioned

## Students' Role

- Engage in the activity using the quality inputs provided by the teacher
- Introduce the Venn diagram using page 16 in the grade 7 text book.

## Learning Outcome

- Identifies the closed figure that is used to represent a set as a Venn diagram
- Represents a given set by a Venn diagram

Two activities related to these are given below

## Activity 01

### Quality Input

- One copy of annex 2.2 for each group
- Scissors
- Glue

### Teachers' Role

- Give one copy of annex 2.3.1 and 2.3.2 for each group
- Distribute the other quality inputs
- Use the letters in one row in annex 2.3.2 for the relevant set in annex 2.3.1 (Don't mix the letters in two rows)
- Give instructions that an element in a set cannot be repeated

## Students' Role

- Cut and separate the letters of each word in annex 2.3.1 and past the relevant letters on activity sheet 2.3.2

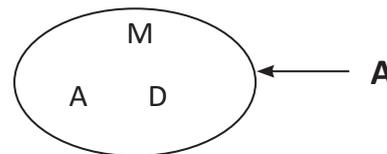
Ex:- 1)



2)



3)  $A = \{ \text{letters of the words 'MADAM'} \}$



Consider that an element in a set cannot be repeated

## Activity 02

## Quality Input

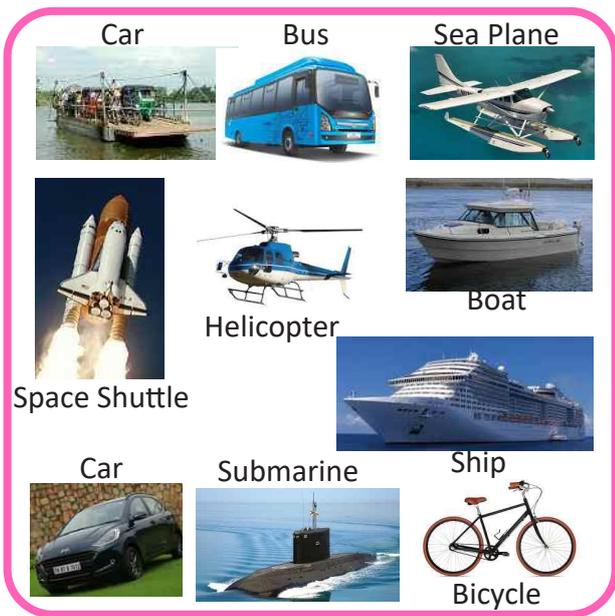
- Domino cards in annex 2.4

## Teachers' Role

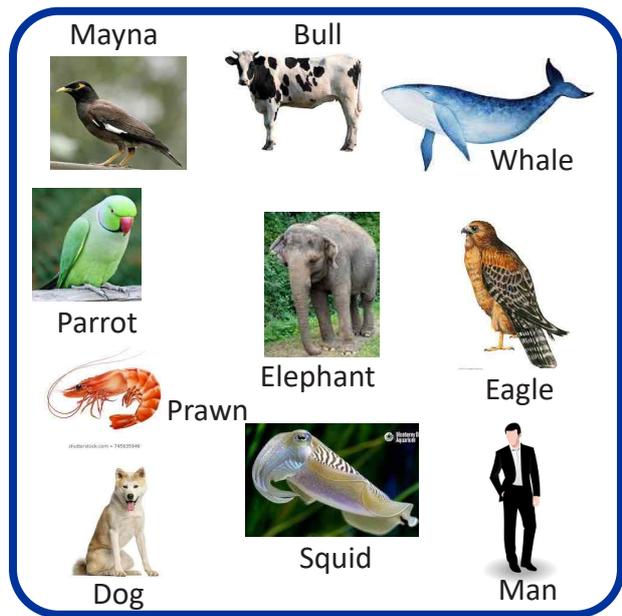
- Prepare the domino chain and check the accuracy of domino cards
- Explain the method of making domino chain and engage the students in the activity

## Students' Role

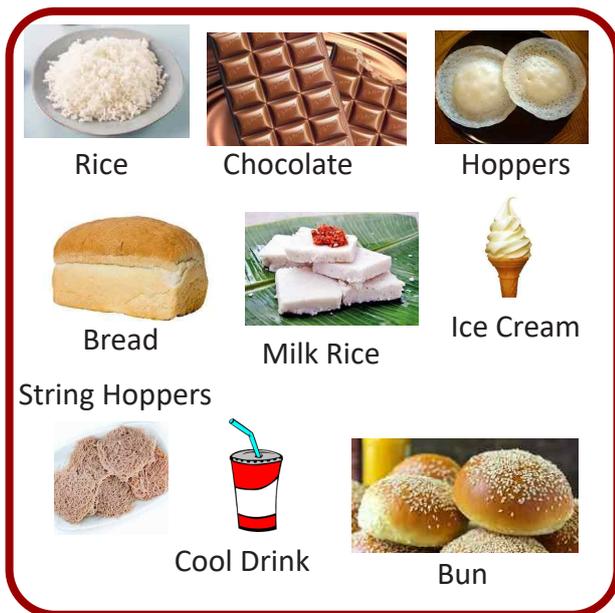
- Prepare the domino chain according to the instructions given by the teacher



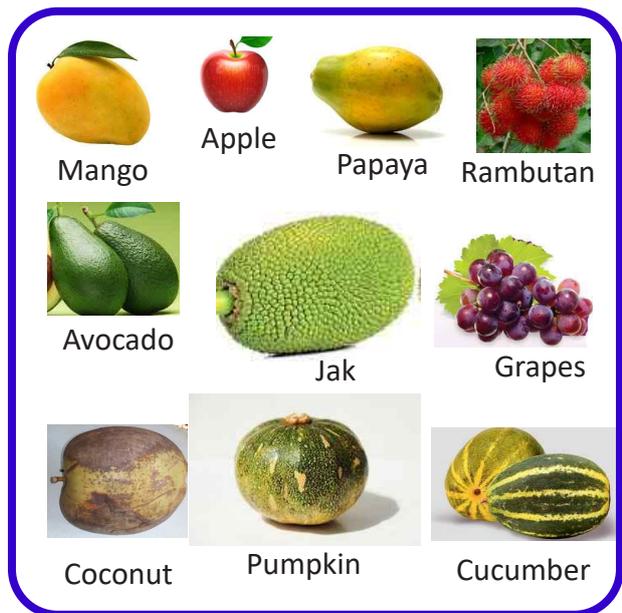
Group 1



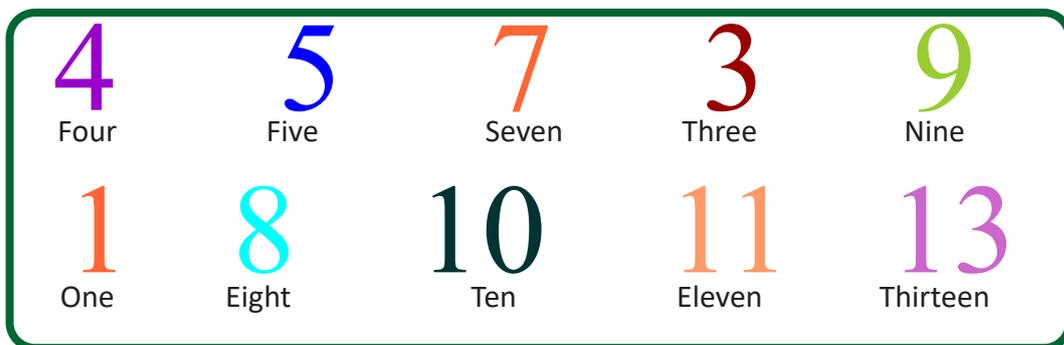
Group 2



Group 3



Group 4



Group 5

### Activity Sheet

- Separate the figure into three groups and past inside the boxes
- Mention the characteristics according to the grouping and suggest a name

Characteristics

- 1. ....
- 2. ....

Name : .....

Characteristics

- 1. ....
- 2. ....

Name : .....

Characteristics

- 1. ....
- 2. ....

Name : .....

### Activity Sheet

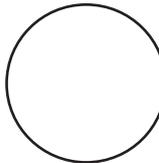
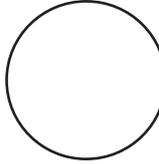
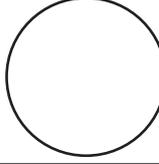
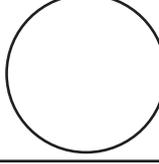
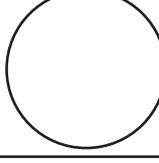
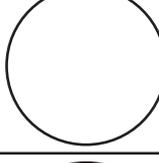
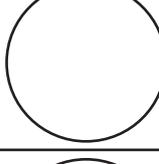
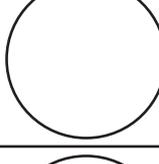
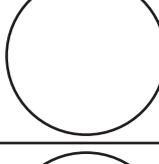
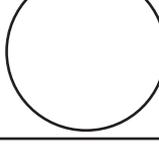
- Engage the activity using the letters of the word given below

ANT GIRL FLOWER GREEN MAHARAGAMA
--

- Prepare above words on a bristol board using the set of letters given
- Complete the table given below using them

Word	Letters needed to make the word
ANT	A, N, T
GIRL	
FLOWER	
GREEN	
MAHARAGAMA	

- Fill in the blanks given below using above information and the example
  - { letters of the word ANT } = { A, N, T }
  - { letters of the word GIRL } =
  - { letters of the word FLOWER } =
  - { letters of the word GREEN } =
  - { letters of the word MAHARAGAMA } =

A = { letters of the word MADAM }	
B = { letters of the word MAHARAGAMA }	
C = { letters of the word DEHIATHTHAKANDIYA }	
D = { letters of the word ELEVEN }	
E = { letters of the word POLONNARUWA }	
F = { letters of the word HIPPOPOTAMUS }	
G = { Digits of the number '200259' }	
H = { Digits of the number '101101011' }	
I = { letters of the word KATARAGAMA }	
J = { Digits of the number '201608307' }	

M	A	D	A	M
---	---	---	---	---

M	A	H	A	R	A	G	A	M	A
---	---	---	---	---	---	---	---	---	---

D	E	H	I	A	T	H	T	H	A	K	A	N	D	I	Y	A
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

E	L	E	V	E	N
---	---	---	---	---	---

P	O	L	O	N	N	A	R	U	W	A
---	---	---	---	---	---	---	---	---	---	---

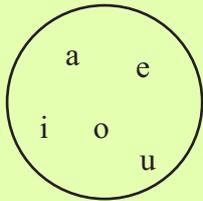
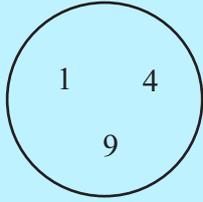
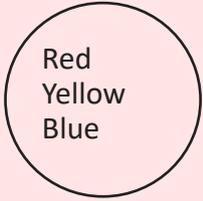
H	I	P	P	O	P	O	T	A	M	U	S
---	---	---	---	---	---	---	---	---	---	---	---

2	0	0	2	5	9
---	---	---	---	---	---

1	0	1	1	0	1	0	1	1
---	---	---	---	---	---	---	---	---

K	A	T	H	A	R	A	G	A	M	A
---	---	---	---	---	---	---	---	---	---	---

2	0	1	6	0	8	3	0	7
---	---	---	---	---	---	---	---	---

{Multiples of 2 less than 10}	{ Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday }	{Days of week}	
{ Vowels of English alphabet }		{ letters of the word MAHARAGAMA }	
{ Squire number less than 10 }	{ Puttlam, Kurunegala }	{ Districts in north western province }	{A,N, U,R, D, H, P, U}
{ letters of the word ANURADHAPURA }	{ 1, 3, 6 }	{ Triangular numbers less than 10 }	{ 1, 9, 8, 7, 2 }
{ Digits of the number 1987112 }	{ 2, 3, 5, 7, 11, 13, 17, 19 }	{ Prime numbers from 10 to 20 }	
{ Four legged animals }		{ Basic colours }	{2, 3, 4, 5, 6, 7, 8}
{ Whole numbers between 1 and 9 }	{ 2, 4, 6, 8, .... } ·	{Multiples of 2 }	{2, 4, 6, 8}

# 3

## Mathematical Operations on whole numbers

**Competency 1 :** Manipulates the mathematical operations in the set of real numbers to fulfill the needs of day to day life

**Competency Level 1.1 :** Methodically simplifies expressions involving whole numbers

**Learning Outcomes-**

- Follows the rules on the order of the application of operations (BODMAS) when manipulating numbers under the arithmetic operations.
- Simplifies numerical expressions of whole numbers consisting of no more than three digits involving the basic arithmetic operations, solving out to a positive whole number.
- Simplifies numerical expressions of whole numbers consisting of no more than three digits and involving the basic arithmetic operations and parentheses, that result in a solution which is a positive whole number.

**Idea to the teacher**

'BODMAS' method to simplify an expression involving mathematical operations such as  $+, -, \times, \div, ( )$  is introduced in Grade 07

**Learning Outcome**

- Follows the rules on the order of the application of operations (BODMAS) when manipulating numbers under the arithmetic operations.

An activity related to this is given below

Refer page numbers 42,43 in the grade 7 Teacher's Guide.

**Activity 01**

**Quality Input**

- Activity sheets in annex 3.1

**Teachers' Role**

- Give copies of annex 3.1 to each pair of students
- When simplifying a mathematical expression including addition (+), Subtractions (-), multiplication ( $\times$ ), and division ( $\div$ )
  - Explain that first multiplications and divisions from left to right must be done and,
  - Then the addition and subtraction from left to right must done
- Engage the students in the activity
- Summarize about the order of simplifications at the end of the activity.
- Engage the students in exercise 3.1 on page 20 and exercise 3.3 on page 23.

### Students' Role

- Complete the activity according to the instructions given by the teacher

### Learning Outcome

- Simplifies numerical expressions of whole numbers consisting of no more than three digits involving the basic arithmetic operations, solving out to a positive whole number.
- Simplifies numerical expressions of whole numbers consisting of no more than three digits and involving the basic arithmetic operations and parentheses, that result in a solution which is a positive whole number.

An activity related to this is given below

### Activity 01

#### Quality Input

- Bristol board
- Copies of annex 3.2 (Tarsia Puzzle)

#### Teachers' Role

- Prepare the sets of cards by pasting annex 3.2 on Bristol boards.
- Group the students appropriately and give them sets of cards.
- Give instructions about the tarsia puzzle.
- State that the group who complete the task accurately within minimum time is winning team.

#### Students' Role

- Match the cards appropriately by connecting cards accurately with a minimum time.

## Activity Sheet

When simplifying a mathematical expression including addition, subtraction, multiplication and division,

1. First do modifications and divisions from left to right
2. Then do addition and subtraction from left to right

1. Simplify the expressions given below and write the answer selecting from the box.

$$1. \quad 5 + 10 \times 2 \quad = \dots\dots\dots \quad \boxed{30} \quad \boxed{25}$$

$$2. \quad 10 - 8 \div 2 \quad = \dots\dots\dots \quad \boxed{1} \quad \boxed{6}$$

$$3. \quad 5 \times 4 + 2 \quad = \dots\dots\dots \quad \boxed{22} \quad \boxed{30}$$

$$4. \quad 8 \times 3 - 2 \div 2 \quad = \dots\dots\dots \quad \boxed{23} \quad \boxed{11}$$

$$5. \quad 60 \div 5 \times 3 + 4 \quad = \dots\dots\dots \quad \boxed{40} \quad \boxed{8}$$

$$6. \quad 10 - 3 \times 2 \quad = \dots\dots\dots \quad \boxed{4} \quad \boxed{14}$$

$$7. \quad 20 \div 2 + 16 \div 2 \quad = \dots\dots\dots \quad \boxed{18} \quad \boxed{13}$$

$$8. \quad 10 \times 2 + 16 \div 4 \quad = \dots\dots\dots \quad \boxed{1} \quad \boxed{16} \quad \boxed{2}$$

$$9. \quad 40 \div 2 + 8 \div 4 \quad = \dots\dots\dots \quad \boxed{7} \quad \boxed{22} \quad \boxed{1}$$

$$10. \quad 36 \div 2 \times 3 + 4 \div 2 \quad = \dots\dots\dots \quad \boxed{29} \quad \boxed{56} \quad \boxed{60}$$

2. Fill in the blanks using the numbers given inside the box

$$1. \quad \underline{\quad} \div \underline{\quad} + \underline{\quad} \quad = 4 \quad \boxed{8} \quad \boxed{2} \quad \boxed{4}$$

$$2. \quad \underline{\quad} + \underline{\quad} \div \underline{\quad} \quad = 4 \quad \boxed{4} \quad \boxed{8} \quad \boxed{2}$$

$$3. \quad \underline{\quad} - \underline{\quad} \times \underline{\quad} \quad = 10 \quad \boxed{10} \quad \boxed{50} \quad \boxed{4}$$

$$4. \quad \underline{\quad} \div \underline{\quad} + \underline{\quad} \times \underline{\quad} \quad = 11 \quad \boxed{4} \quad \boxed{9} \quad \boxed{2} \quad \boxed{3}$$

$$5. \quad \underline{\quad} \times \underline{\quad} - \underline{\quad} \times \underline{\quad} \quad = 0 \quad \boxed{20} \quad \boxed{5} \quad \boxed{8} \quad \boxed{2}$$

## 4 Factors and Multiples Part - I

**Competency 1** : Manipulates the mathematical operations in the set of real numbers to fulfill the needs of day to day life.

**Competency Level 1.4** : Makes decisions regarding the divisibility of a number.

### Learning Outcomes-

- Finds the digital root of a number.
- States that when the digital root of a number is a multiple of three, then the number is divisible by three.
- States that if the last two digits of a number are zero or if the last two digits represent a number which is divisible by four, then the number itself is divisible by four.
- States that numbers that are divisible by two and three are divisible by six also.
- States that a number with digital root 9 is divisible by 9.
- Examines whether a number is divisible by 3 or 4 or 6 or 9 by using the rules of divisibility.

### Idea to the teacher

In grade 6, the rules of divisibility of a number by 2, 5, and 10 are identified. Engage the students in the activities, considering the divisibility rules in the summary on page 32 in the text book. Construct the lesson considering the connection between factors and divisibility

### Learning Outcome

- States that a number with digital root 9 is divisible by 9.
  - Examines whether a number is divisible by 3 or 4 or 6 or 9 by using the rules of divisibility
- Two activities related to these are given below

### Activity 01

### Quality Input

- 250 buttons
- Activity sheets (Annex 4.1.1.)

Refer pages 46, 47 in grade 7 Teachers' Guide

### Teachers' Role

- Find out 250 buttons
- Make 5 groups.
- Distribute 50 buttons for each group
- Engage the students in the activity in annex 4.1.2
- Lead a discussion according to the presentations
- Engage the students in the activity 01 on page 30 in grade 7 Mathematics text book

### Students' Role

- Complete the activity in annex 4.1.2
- Discuss your suggestions with the other groups

### Activity 02

#### Quality Input

- 250 buttons
- Activity sheets (Annex 4.1.2.)

#### Teachers' Role

- Find out 250 buttons
- Make 5 groups.
- Distribute 50 buttons for each group
- Engage the students in the activity in annex 4.1.2
- Lead a discussion according to the presentations
- Engage the students in the activity 02 on page 31 in grade 7 Mathematics text book

### Students' Role

- Complete the activity in annex 4.1.2
- Discuss your suggestions with the other groups

#### Learning Outcome

- States that numbers that are divisible by two and three are divisible by six also.  
An activity related to this is given below

### Activity 01

#### Quality Input

- 250 buttons
- Activity sheets (Annex 4.1.3.)

#### Teachers' Role

- Find out 250 buttons
- Make 5 groups of student
- Distribute 50 buttons for each group
- Engage the students in the activity in annex 4.1.3
- Lead a discussion according to the group presentations
- Engage the students in exercise 4.2 on page 31 in grade 7 Mathematics text book

## Students' Role

- Complete the activity in annex 4.1.3
- Discuss your suggestions with the other groups

Annex 4.1.1

### Activity Sheet

Complete the table given below using the button you received

Serial number	Number	When the buttons are separated into groups of 9		Number is		Digital index of number
		Remains	No remains	Divisible by 9	Not divisible by 9	Number
01	18					
02	33					
03	45					
04	19					
05	27					
06	36					
07	49					
08	43					

01. If a number is divisible by 9, what is the digital index of the number?
02. Suggest a method to find out whether a number is divisible by 9 without dividing.

### Activity Sheet

Complete the table given below using the button

Serial number	Number	When the buttons are separated into groups of 3		Number is divisible by 3		Digital index of number
		remains	No remains	Divisible	Not divisible	
01	31					
02	27					
03	42					
04	13					
05	30					
06	36					
07	23					
08	21					
09	18					

01. If a number is divisible by 3, what is the digital index of the number?

02. Suggest a method to find out whether a number is divisible by 3 without dividing.

## Activity Sheet

Complete the table given below using the button

Serial number	Number	When the buttons are separated into groups of 6		Number is		Divisible by 2 or not	Divisible by 3 or not
		remains	No remains	Divisible by 6	Not divisible by 6		
01	13						
02	18						
03	27						
04	30						
05	41						
06	42						
07	33						
08	24						
09	36						
10	19						
11	8						

01. Complete the table given below

Numbers divisible by both 2 and 3	Both Numbers divisible by 6

02. Hence, suggest a method to find out whether the number is divisible by 6, without dividing .

## 4 Factors and Multiples Part - II

**Competency 1** : Manipulates the mathematical operations in the set of real numbers to fulfil the needs of day to day life.

**Competency Level 1.3** : Solves simple problems using the factors and multiples of numbers

**Learning Outcomes –**

- Writes down the prime factors of a number consisting of no more than two digits.
- Accepts that the highest common factor (of no more than three numbers) is the largest number which divides each of the given numbers without remainder.
- Finds the highest common factor of no more than three numbers.
- Finds the least common multiple of no more than three numbers by considering the multiples of each of them.
- Accepts that the least common multiple of several numbers is the smallest number than can be divided without remainder by each of them.
- Finds the least common multiple of no more than three numbers using their prime factors.
- Applies the knowledge on factors and multiples to solve simple problems

### Idea to the teacher

In grade 6 students have learnt basics of factors and multiples. This lesson is an initiative step of factoring algebraic expressions and finding least common multiple.

### Learning Outcome

- Writes down the prime factors of a number consisting of no more than two digits
- Writes down the prime factors of a number consisting of no more than two digits

An activity related to this is given below

Refer ages 47, 48 in grade 7 Teachers' Guide and page numbers 37, 38, 39 in grade 7 text book.

## Activity 01

### Quality Input

- Activity sheets in annex 4- II.1.2 ( for each student )
- Entered activity sheet on a demy paper.
- Write 10 numbers, less than the total number of students, on A4 sheets, with one number in one sheet of paper.
- Past the numbers in annex 4-II.1.2 on a cupboard and cut them. Cards for a group of 20 are given in annex 4-II.1.2 prepare cards such that number of cards equal to the number of students

### Teachers' Role

- Give activity sheet in annex 4-II .1.1 and one number from annex 4-II1.2 in order, for each student.
- Display a number on a A4 sheet.
- Ask the students to get into pairs such that the product of two numbers is equal to the number displaced.
- Before displaying a new number, change the numbers of the students.
- Lead a discussion on introduction of factors, prime numbers and prime factors.
  - When displaying numbers, display the numbers where the factors are less than the total number of students.
  - Display at least two prime numbers, to discuss about prime numbers.
  - Display numbers which have more factors.

### Students' Role

- Complete activity sheet 4-II.1.1 according to the instructions given by the teacher

### Learning Outcome

- Accepts that the highest common factor (of no more than three numbers) is the largest number which divides each of the given numbers without remainder.

An activity related to this is given below

Pay attention on pages 47, 48 in grade 7 Teachers' Guide and page numbers 37, 38, 39 in grade 7 text book.

## Activity 01

### Quality Input

- Activity sheets in annex 4- II.2.1 and annex 4- II.2.2 for each group
- Felt pens for each group

### Teachers' Role

Group the students appropriately and distribute activity sheets in annex 4- II.2.1 and annex 4- II.2.2 for each group.

- Give the numbers relevant to the blanks A and B in the activity sheet 4- II.2.1 and x, y, z in the activity sheet in annex 4- II.2.2 from the table given below

Group	Activity sheet 4- II.2.1		Annex 4- II.2.2		
	A	B	x	y	z
01	10	20	4	8	12
02	49	21	12	18	36
03	12	18	13	33	55
04	36	12	10	15	20
05	11	55	9	18	24

- Assist the students to complete the activity sheet and lead a discussion base on the presentations done by the groups.

### Students' Role

- Do the activity in annex 4-II.2.1

### Learning Outcome

- Finds the least common multiple of no more than three numbers by considering the multiples of each of them

An activity related to this is given below

Refer pages 47, 48 in grade 7 Teachers' Guide and page numbers 38, 39 in grade 7 text book.

### Activity 01

#### Quality Input

- Laminated annex 4-II.3.1 pasted on a cupboard.
- White board maker pen
- 3 dice in 3 different colours with the numbers given below written on them for each group

White die	2	4	6	8	10	12
Red die	9	18	5	4	3	6
Yellow die	12	4	5	10	18	3

#### Teachers' Role

- Prepare 3 dice as given above for each group.
- Group the students appropriately
- Distribute 3 dice and activity sheets 4-II.3.1 and 4-II.3.2 for each group
- Give instructions to the students to toss the three dice and write the numbers on the activity sheet. Then ask them to write the multiples of those numbers under that.
- Lead a discussion about the Least Common Multiple of the three numbers

#### Students' Role

- Complete the activity sheet 4-II.3.2 according to the instructions given by the teacher



1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20

## Activity Sheet

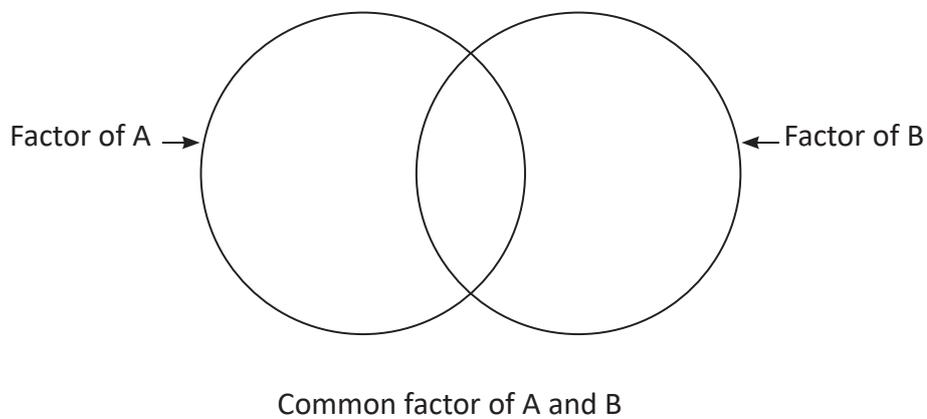
Answer all the questions

(i)  $A = \dots\dots\dots$                        $B = \dots\dots\dots$

1. Factors of  $A = \dots\dots\dots$

2. Factors of  $B = \dots\dots\dots$

(ii) Write the factors in the figure, by writing one factor once only



- What are the common factors of  $A$  and  $B$ ?
- Which one is the largest factor among them?
- Hence, what is the Highest Common Factor?

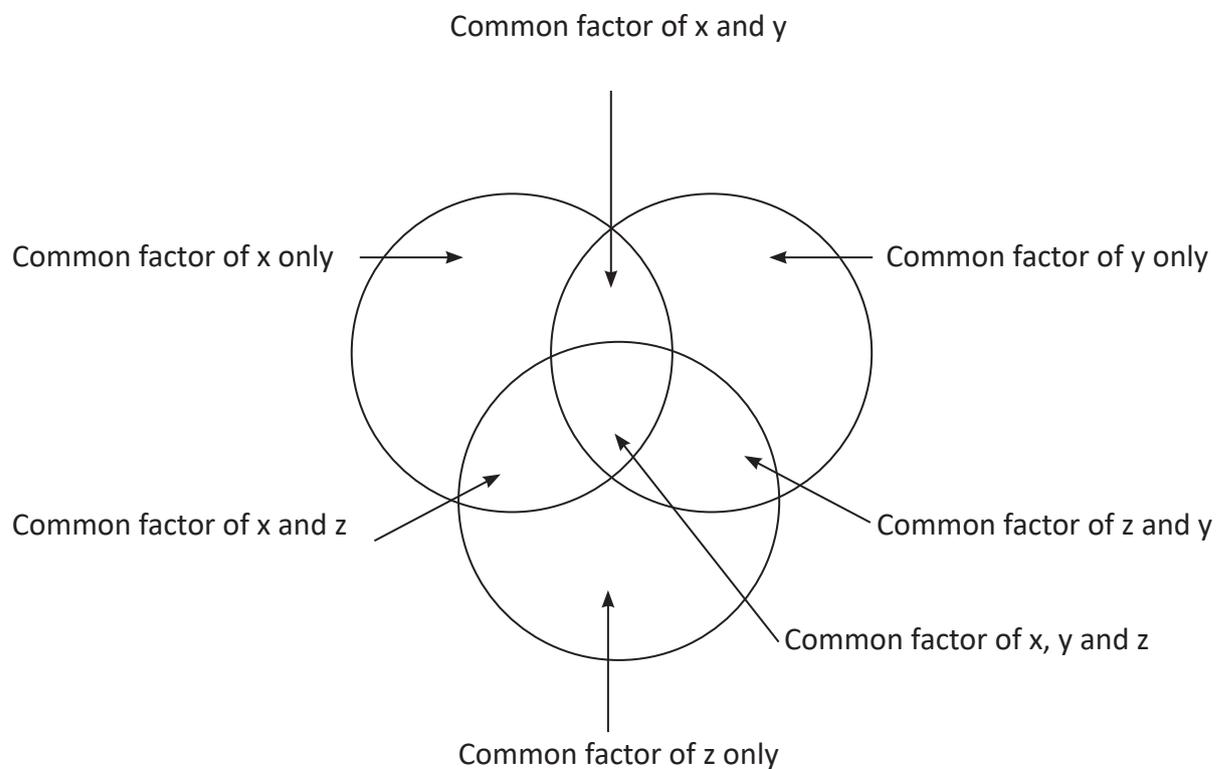
## Activity Sheet II

Answer all the questions

(i)  $x = \dots\dots\dots$      $y = \dots\dots\dots$      $z = \dots\dots\dots$

1. Factors of  $x = \dots\dots\dots$
2. Factors of  $y = \dots\dots\dots$
3. Factors of  $z = \dots\dots\dots$

(ii) Write the factors in the figure, by writing one factor once only



- a) What are the common factors of all three  $x$ ,  $y$  and  $z$ ?
- b) Which factor is the largest factor among them?
- c) Hence, what is the Highest Common Factor of the three numbers?



Complete the table and answer the questions

Serial number	Number obtained from the dice			Common multiples of the 3 numbers	Least Common Multiple	Least Common Multiple of the 3 numbers
	White	Yellow	Red			
1	1	2	3	6, 12, 18, 24	6	6
2						
3						
4						
5						
6						
7						

## 5 Indices

**Competency 6** : Uses logarithms and calculators to easily solve problems in day to day life

**Competency Level 6.1** : Manipulates the laws of indices and simplifies powers that have an algebraic symbol as the base

### Learning Outcomes –

- Writes a number less than 100 as a product of powers of prime factors.
- Finds the value of a product of powers of prime numbers.
- States that when an algebraic symbol is multiplied repeatedly, a power is obtained, with base the algebraic symbol and index the number of times the symbol is repeatedly multiplied.
- Expands products of powers of the form  $x^m y^n$  ( $m, n < 4$ ).
- Writes a product of algebraic terms in the form  $x^m y^n$ .
- Finds the value of a power that has an algebraic symbol as its base, by substituting positive integers.
- By substituting positive integers, finds the value of a product of powers that have algebraic symbols as bases

### Idea to the teacher

The usage of indices facilitate of simplifications and representation of an expression. In grade 6, the index notation is recognized and a number which can be written as a power of a whole number is written as a power, where the base is a prime number. Expressing a number which can be written as a power of a product of two or more than two prime numbers and expressing a number as a power that has an algebraic symbol as the base are to be studied in grade 7. One step of competency use of logarithms and calculator must be completed using these classroom activities and is a foundation for multiplication and division of indices and definition of logarithm in grade 8.

### Learning Outcome

- Writes a number less than 100 as a product of powers of prime factors.
- An activity related to this is given below

### Activity 01

### Quality Input

- Colour A4 Sheets (White, red, blue, yellow, green)
- Glue

### Teachers' Role

- Make puncher dots using red, blue, yellow, and green A4 sheets.
- Divide the students into small groups.
- Give instructions that the red, blue, yellow and green dots represents the prime numbers 2, 3, 5, and 7 respectively and provide sufficient puncture dots to each group.
- Give each group a copy of activity sheet in Annex 5.1.
- Explain the way of doing the activity using the example given in Annex 5.1.
- Refer page numbers 48 - 50 in the Teacher's Guide
- Engage the students in the review exercises on page 52, exercise 5.1 on page 53 and exercise 5.2 on page 55

### Students' Role

- Do the activity according to the instructions in the activity sheet.
- Do the review exercises on page 52, exercise 5.1 on page 53 and exercise 5.2 on page 55

### Learning Outcome

- Finds the value of a product of powers of prime numbers.  
An activity related to this is given below

### Activity 01

### Quality Input

- Cubical dies
- Copies of the activity sheets in Annex 5.2

### Teachers' Role

- Paste the numbers 2, 3, 5 on the dies in a way of getting the same number in the opposite sides.
- Divide the class into small groups and give each group a copy of the activity sheet in Annex 5.2 and dies.
- Engage the students in the activity.
- Refer page numbers 50 - 52 in the Teacher's Guide

### Students' Role

- Complete the activity sheet 5.2, using the values you obtain by tossing the dies.
- Do the activity by increasing the number of times as 4 or 5.

## Learning Outcome

- States that when an algebraic symbol is multiplied repeatedly, a power is obtained, with base the algebraic symbol and index the number of times the symbol is repeatedly multiplied.
- Expands products of powers of the form  $x^m y^n$  ( $m, n < 4$ ).
- Writes a product of algebraic terms in the form  $x^m y^n$ .

An activity related to this is given below

## Activity 01

### Quality Input

- Domino cards prepared according to the Annex 5.3
- A4 Sheets
- Glue

### Teachers' Role

- Prepare domino cards according to the Annex 5.3
- Divide the class into small groups and give a set of domino cards to each group.
- Engage the students in the activity.
- Refer pages numbers 50 - 52 in the Teachers Instruction Manual.
- Engage the students in the exercise 5.2 on page 55 in the text book

### Students' Role

- Complete the domino chain using the domino cards provided.
- Do the exercise 5.2 on page 55 in the text book

## Learning Outcome

- Finds the value of a power that has an algebraic symbol as its base, by substituting positive integers

An activity related to this is given below

## Activity 01

### Quality Input

- Dies
- Copies of the activity sheets in Annex 5.4.

### Teachers' Role

- Distribute dies and activity sheets in Annex 5.4.
- Engage the students into the activity.
- Refer page numbers 50 - 52 in the Teachers Instruction Manual.
- Let the students do exercise 5.3 on page 56.

### Students' Role

- By taking the value obtained by tossing the die as the value of the algebraic letter  $x$  complete the activity sheet 5.4.
- Do the exercise 5.3 on page 56 in the text book.

### Learning Outcome

- By substituting positive integers, finds the value of a product of powers that have algebraic symbols as bases

An activity related to this is given below

### Activity 01

### Quality Input

- Tarsia cards as gives in annex 5.5.
- Copy of Annex 5.6

### Teachers' Role

- Prepare tarsia cards using small groups and distribute a set of tarsia cards to each group.
- Engage the students into the activity.
- Let the students complete activity sheet in annex 5.6
- Refer page numbers 48 - 52 in the Teacher's Guide
- Engage the students in the exercise 5.3 on page 56 in the text book

### Students' Role

- Arrange the tarsia cards accordingly and complete the puzzle.
- Complete the table given in the activity sheet 5.6.
- Do the exercise 5.3 on page 56

## Activity Sheet

Arrange the given numbers as a product of prime numbers using puncture dots

 = 2, 
  = 3, 
  = 5, 
  = 7,

Number	As a product of prime numbers	Index form
60	    ↑    ↑    ↑    ↑ 2 × 2 × 3 × 5	$2^2 \times 3 \times 5$
18		
24		
36		
84		

**Instructions :** - Start from the smallest prime number. If the given number is divisible by the smallest prime number paste a puncture dot with the relevant colour. Again see whether the answer is divisible by the same prime again. If so, paste a relevant dot as earlier. If the given number is not divisible by the smallest prime, consider the next smallest prime. Accordingly write the number in index form.

### Activity Sheet

Complete the task using the values obtained by tossing the dies

Values obtained by tossing the die

Index form

$$2^2 \times 3 = 2 \times 2 \times 3 = 12$$

As a product of prime numbers

= =

= =

= =

= =

$x^2y^2$	$x \times x \times x \times y \times y$	$6^2y^4$	$a \times a$
$x^3y^2$	$x \times x \times x$	$a^2$	$2 \times p \times p$
$x^3$	$a \times a \times a \times a$	$2p^2$	$2 \times 2 \times 2 \times m \times m$
$a^4$	$m \times m \times m \times n \times n$	$2^3m^2$	$3 \times 3 \times x \times x \times x$
$m^3n^2$	$7 \times 7 \times 7 \times p \times p$	$3^2x^3$	$3 \times 3 \times m \times m$
$7^3p^2$	$6 \times 6 \times y \times y \times y \times y$	$3^2m^2$	$x \times x \times y \times y$

### Activity Sheet

Complete the table by using the values obtained by tossing the die as the values of the algebraic letter x

Expression	Expansion	Value
$x^3$		
$x^4$		
$3x^2$		
$2a^2$		
$7y^3$		

### Activity Sheet

Complete the table using  $a = 2$  and  $b = 7$

Expression	Expansion	Value
1. $a^2b$	$a \times a \times b$	$2 \times 2 \times 7 = 28$
2. $ab^2$		
3. $a^3b^2$		
4. $3a^2b^2$		
5. $a^2b^3$		
6. $2a^3b$		
7. $3ab^2$		
8. $2a^2$		
9. $2^2a^2$		
10. $7a^2$		
11. $5a^3$		
12. $3b^2$		

## Activity Sheet

Obtain a geometrical shape by matching given expansions and values

The diagram shows a 3D structure composed of 12 triangular faces. The expressions on the faces are:

- Top-left face:  $7 \times a \times a$
- Top-right face:  $2 \times 2 \times a^2$
- Left face (top):  $a^2 b$
- Right face (top):  $2 \times a \times a$
- Left face (middle):  $a \times a \times a \times b \times b$
- Right face (middle):  $9 \times b \times b$
- Left face (bottom):  $3a^2 b^2$
- Right face (bottom):  $a^3 b^2$
- Left face (bottom):  $2a^3 b$
- Right face (bottom):  $3 \times a \times a \times a$
- Bottom-left face:  $a \times a \times b \times b \times b$
- Bottom-right face:  $3 \times a \times b \times b$
- Bottom-most face:  $2a^2$

Below the structure are two 2x2 grids of boxes for matching:

$3 \times a \times a \times b \times b$	$a^2 b^3$	$7a^2$	$5a^3$
		$2 \times 2 \times a \times a$	

$a \times a \times b$	$q \times b \times \epsilon$	$3ab^2$	$2 \times a \times a \times a \times b$
$ab^2$			

## 6 Time

**Competency –12:** Manages time to fulfill the needs of the world of work

**Competency Level 12.1:** Manipulates measurements of time under addition and subtraction

**Learning Outcomes –**

- Identifies the units month, year, decade, century and millennium which are used to measure time.
- Identifies a leap year.
- States the relationships between days, months and years.
- Converts units used to measure time; year → month, month → day, year day.
- Adds, subtracts time given in terms of days and months
- Adds, subtracts time given in terms of months and years.
- Adds, subtracts time given in terms of days, months and years

### Idea to the teacher

In grade 6, seconds, minutes and hours are identified as units of measuring time and found the time duration for a specific work. In this grade, students identify more about units of measuring time by studying months, years, decades, centuries and millennium. And also addition and subtraction of units of time are studied in this grade. Calculating the standard time using time zones will be studied in grade 8.

### Learning Outcome

- Identifies the units month, year, decade, century and millennium which are used to measure time

An activity related to this is given below

Refer pages 53, 56 in grade 7 Teachers' Guide

## Activity 01

### Quality Input

- Five boxes ( somewhat large )
- A card for each student (Annex 6.1 A)
- Sheet in Annex 6.1B

### Teachers' Role

- Engage the lesson by introducing decade is a ten years' time period
- Paste the sheets ( each decade ) in the five boxes and exhibit in the class room.
- Give a card of annex 6.1A for each student and ask them to put them into the correct box according to the year in the card.
- Discuss about the accuracy after the activity.
- Use this activity to introduce century and millennium by making suitable amendments

### Students' Role

- Put the card you obtained to the correct box.
- Discuss about the activity with the teacher

### Learning Outcome

- Identifies a leap year

An activity related to this is given below

## Activity 01

### Quality Input

- Two boxes
- A card for each student given in (annex 6.3)
- Sheets in annex 6.4

### Teachers' Role

- Engage the lesson by introducing a leap year.
- Paste the sheets of paper in annex 6.4 in two boxes and exhibit in the class.
- Give one card for each student ( in annex 6.3) and ask them to put that into the relevant box, considering the year in the card.
- Discuss the accuracy at the end of the activity.

### Students' Role

- Put the card you received into the suitable box.
- Discuss the accuracy with the teacher

### Learning Outcome

- States the relationships between days, months and years.
- Converts units used to measure time; year    month, month    day, year day.

Two activities related to these are given below

### Activity 01

#### Quality Input

- An activity sheet for each student (annex 6.3)

#### Teachers' Role

- Distribute an activity sheet for each student and ask them to fill the table in it.

#### Students' Role

- Complete the table given in the activity sheet 6.3

## Activity 02

### Quality Input

- Sectors with the same radii (in annex 6.4) and circular laminar.
- 35 sectors and 4 circular laminar for each student

### Teachers' Role

- Give 12 sectors ( in annex 6.4 ) and several of circular laminar for each students.
- Instruct the students to write as 15 months, 19 months, 25 months, 30 months for each instance and ask them to write that with number of years and months.
- State that each circle is divided into 12 sectors.
- Ask the students to make circles by matching sectors.
- Ask the students to complete activity sheet 6.5
- Engage the students in the review exercises on page 65 - 67, exercise 5.1 in the text book.

### Students' Role

- Try to make circles by matching the sectors you obtained.
- Complete the activity sheet 6.4 using that

## Activity Sheet

## Part A

1991	1993	1998	1995	1999
2002	2003	2005	2007	2008
2010	2013	2016	2017	2019
2022	2024	2026	2028	2029
1992	2004	2015	2023	2018

## Part B

199 Decade

200 Decade

201 Decade

202 Decade

203 Decade

## Part A

1991	1993	1908	1996
1999	2002	2000	2005
2007	2008	2010	2012
2016	2017	2019	2400
2024	1992	2300	2500
2029	2004	2024	2018

## Part B

A leap year

Not a leap year

## Activity Sheet

$$\text{Year 1} = \text{Month } 12 = 12$$

$$\text{Year 2} = \text{Month } 12 \ 12 = 24$$

$$\text{Year 3} = \text{Month } \quad \quad =$$

$$\text{Year 4} \quad \quad \quad$$

$$\text{Year 5} \quad \quad$$

$$\text{Month 1} = \text{Days } 30 = 30$$

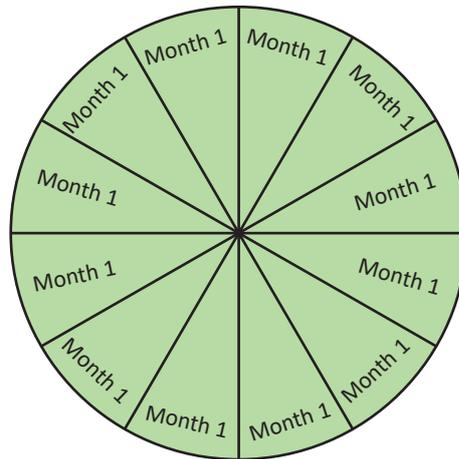
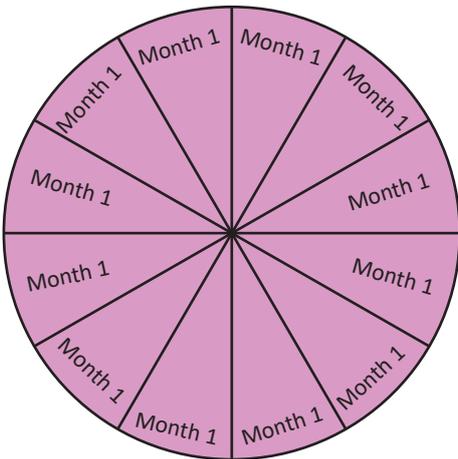
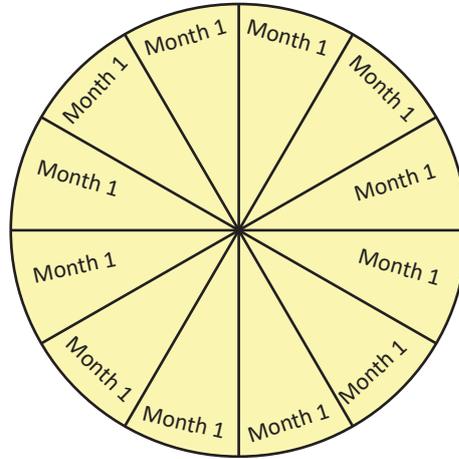
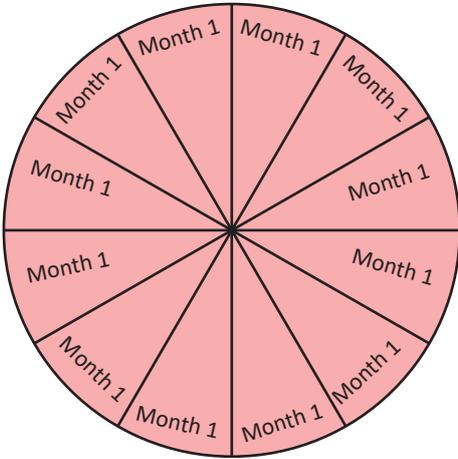
$$\text{Month 2} = \text{Days } 30 \ 30 = 60$$

$$\text{Month 3} = \text{Days } \quad \quad \quad =$$

$$\text{Month 4} \quad \quad$$

$$\text{Month 5} \quad \quad$$

Divide a circle into 12 equal sectors and separate using scissors. Distribute 35 sectors for each student.



Number of sectors (Number of months)	Number of circular (laminas can be made)	Remaining number of sectors	Years and months
15			
19			
25			
30			

# 7

## Parallel Lines

**Competency 27 :** Analyzes according to geometric laws the nature of the locations in the surroundings

**Competency Level 2 7.1** Draws plane figures by considering the parallelism of a pair of straight lines

### Learning Outcomes-

- Recognizes straight lines between which there is an equal gap as parallel lines.
- Recognizes the gap between a pair of parallel lines as the perpendicular distance, or else the shortest distance between the two lines
- Identifies locations in the environment that contain parallel lines.
- Examines whether a given pair of straight lines is parallel or not by using a set square and a straight edge.
- Draws various pairs of parallel lines using a set square and a straight edge.
- Draws a line parallel to a given straight line at a given distance using a set square and a straight edge.
- Draws a line parallel to a given straight line through a given point outside the line, by using a set square and a straight edge.
- Draws various plane figures containing parallel lines using a set square and a straight edge

### Idea to the teacher

The plane figures drawn using only straight line segment was studied in grade 6. The concepts of parallel lines, intersection of two straight lines and perpendicular distance between two straight lines are discussed in this lesson. In grade 9, the features of the angles formed, when two parallel lines are intersected by a transversal are discussed with the students.

### Learning Outcome

- Recognizes straight lines between which there is an equal gap as parallel lines.
- Recognizes the gap between a pair of parallel lines as the perpendicular distance, or else the shortest distance between the two lines

An activity for these is given below.

Refer page numbers 57,58 in the grade 7 Teachers' Guide

## Activity 01

### Quality Input

- Activity sheet (Annex 7.1) for each group
- Pieces of ekles with a length about 30cm for each group.

### Teachers' Role

- Group the students appropriately and distribute a copy of the activity sheet (Annex 7.1) and pieces of ekle to each group.
- Ask the students to keep two pieces of ekles on the straight lines in the activity sheet.
- Held a discussion through group presentations, by introducing straight lines which do not intersect as parallel lines and straight lines which intersect at a point as not parallel lines.
- Engage the students in the exercise 7.1 on page 7.3 in the text book.

### Students' Role

- Keep the two pieces of ekles on one pair of straight lines in the activity sheet (Annex 7.1)
- Observe whether the two straight lines meet each other or not and write down the observation inside the squares.

### Learning Outcome

- Draws various pairs of parallel lines using a set square and a straight edge.
- Draws a line parallel to a given straight line at a given distance using a set square and a straight edge

An activity for this is given below.

Pay attention on page number 58 of the grade 7 Teachers' Guide.

## Activity 01

### Quality Input

- Activity sheets in Annex 7.2
- Set square and straight edge.
- White oil papers (A4 Size)

### Teachers' Role

- Group the students appropriately and distribute the quality inputs and activity sheets.
- Engage the students in the activity as in annex 7.2
- Held a discussion after the group presentations.
- Ask students to do the activities on pags 72, 74 in the text book.

### Students' Role

- Do the Activity according to the activity sheet you obtained.
- Display your creations to the other groups.at the end of the activity.

### Learning Outcome

- Draws a line parallel to a given straight line through a given point outside the line, by using a set square and a straight edge.

An activity related to this is given below

## Activity 01

### Quality Input

- Set square and straight edge
- White oil papers (A4 Size)

### Teachers' Role

- Group the students appropriately and distribute the quality inputs
- Lead a discussion after the presentations about group constructions.
- Engage students in Activity 4 on page 73 in the text book

### Students' Role

- Engage in activity 4 on page 73 in the text book.
- Display your constructions to the class

### Learning Outcome

- Draws various plane figures containing parallel lines using a set square and a straight edge

An activity related to this is given below

### Activity 01

### Quality Input

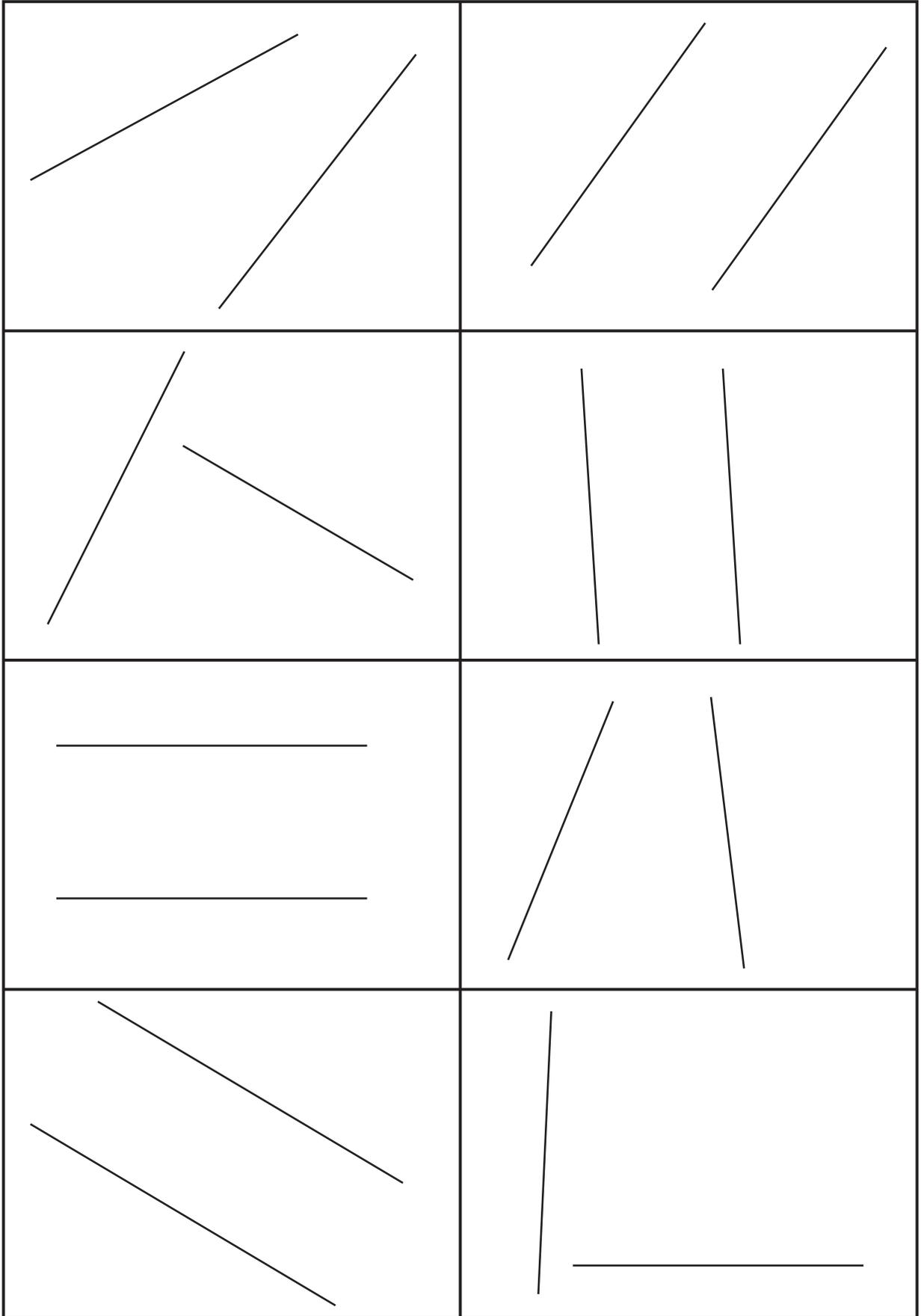
- Sets square and a straight edge.
- White oil papers (A4 size)

### Teachers' Role

- Group the students appropriately and distribute the quality inputs.
- Engage the students in the activity 9 on page 77 in the text book
- Lead a discussion after the presentation of the constructions

### Students' Role

- Engage in activity 9 on page 77
- Display your constructions to the class



## Activity Sheet

### Activity 02

- Draw a straight line in red on the given oil paper.
- Mark two points on that straight line with a distance of 5cm Name those points as A and B.
- Coincide the two points A and B by folding the paper and mark the folded line in blue.
- Mark a point C on this blue line.
- Keep the sets square in a way of coinciding one straight edge of the right angular corner with the folded line.
- Draw a straight line in red through the other edge of the right angular corner.
- Confirm that the two straight lines drawn in red are parallel to each other

# 8

## Directed Numbers

**Competency 1:** Manipulates the mathematical operations in the set of real numbers to fulfill the needs of day to day life.

**Competency Level 1.2 :** Adds directed numbers with an understanding of directions

### Learning Outcomes

- States that a directed number is a one written with a positive or negative sign, to indicate that it is located at a certain distance from the origin of the number line in a particular direction.
- Using the number line, states that the sum of two positive integers is a positive integer.
- Using the number line, states that the sum of two negative integers is a negative integer.
- Using the number line, states that the sum of two integers of different signs is the difference between the numerical values of the two numbers.
- Accepts that the sign of the sum of two integers of different signs is the sign of the integer of larger numerical value.
- Adds integers with the aid of the number line.
- Adds directed numbers without using the number line.

### Idea to the teacher

When representing a number with both the magnitude and direction it is known as a directed number and '+' and '-' symbols are used to represent the direction.

Though the direction of a positive number is not represented using '+' symbol, it is considered as a directed number.

When adding two directed numbers, the sign of the answer depend on the sign of the numbers added

## Learning Outcome

- Using the number line, states that the sum of two positive integers is a positive integer.
- Using the number line, states that the sum of two negative integers is a negative integer.
- Using the number line, states that the sum of two integers of different signs is the difference between the numerical values of the two numbers.
- Accepts that the sign of the sum of two integers of different signs is the sign of the integer of larger numerical value.
- Adds integers with the aid of the number line.

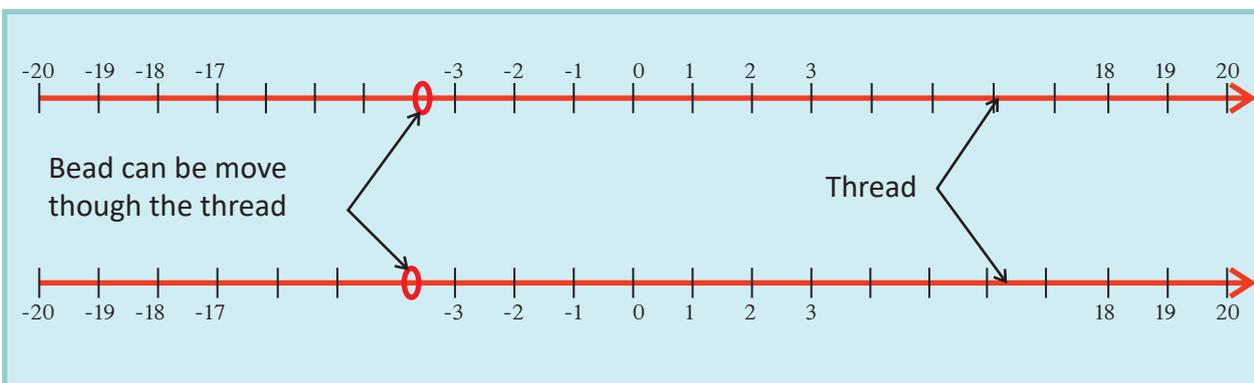
An activity related to these is given below

Refer pages numbers 61, 62 in grade 7 Teaches' Guide

## Activity 01

### Quality Input

- Two activity sheets for each group given in annex 8.1.1
- Dodecahedron for each group. (numbered -5 to +6)
- A number line prepared as given below (-20 to +20)



## Teachers' Role

- Use a stripe of cardboard of length 50cm and breadth 4cm and fix two pieces of thread with a bead. (The bead must be able to move through the thread)
- Prepare a number line (-20) to (+20) where the thread is the axis.
- Group the Students and distribute materials.(Separate each group into two sub groups)
- Give common instructions as given below and engage in the activity.
- First keep the two beads at 0
- Toss the do decahedron and if the value is positive, move the bead to the positive direction and if the value is negative move the bead to the negative direction.
- The group reach +20 first win the game
- Complete the activity sheet 8.1.1
- Lead a discussion on addition of two positive integers, addition of two negative integers and addition of two integers with different signs

## Students' Role

- Engage in the activity according to the instruction given by the teacher and complete the activity sheet 8.2.1

## Learning Outcome

- Adds directed numbers without using the number line.

An activity related to this is given below

## Activity 01

## Quality Input

- 15 red and 15 blue buttons for each group
- An activity sheet (annex 8.2.1 ) for each group



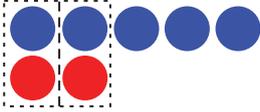
**Activity Sheet**

Complete the table given below.

Serial No.	Position of the bead before tossing the dodecahedron	Number obtained by tossing the dodecahedron	Addition in Expression	Answer
1	+2	-2	$(+2) + (-2)$	0
2	0			
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

## Activity Sheet

Complete the table given below using red and blue buttons

01	$+5 + (-2)$	 $= 0 + 0 + 3$	+3
02	$+6 + (-4)$		
03	$(-3) + (+4)$		
04	$(+10) + (-6)$		
05	$(+12) + (-2)$		
06	$(+6) + (-6)$		

**Competency 21** : Makes decisions by investigating the relationships between various angles

**Competency Level 21.1** : Analyzes angles through static and dynamic concepts

**Learning Outcomes -**

- Gains an understanding of the concept of static angle by considering certain locations in the environment.
- Gains an understanding of the concept of dynamic angle by considering certain rotations in the environment.
- Recognizes that an angle is formed by the intersection of two straight line segments.
- Identifies the arms and the vertex of an angle when a figure of an angle is given.
- Draws a straight line segment using a straight edge and names it.
- Draws various angles using a straight edge and names them.
- Writes down the arms, vertex and the angle when a figure of an angle which has been named is given.
- Identifies the protractor as an instrument which is used to measure the magnitude of angles
- Measures given acute/obtuse/reflex angles using a protractor.
- Draws acute/obtuse/reflex angles of given magnitude using a protractor

**Competency Level 21.2** : Investigates the magnitude of angles

**Learning Outcomes –**

- Recognizes that the magnitude of a right angle is  $90^\circ$ .
- Recognizes that the magnitude of a straight angle is  $180^\circ$ .
- Identifies acute angles, obtuse angles and reflex angles by means of angles of magnitude  $90^\circ$  and  $180^\circ$ .

### Idea to the teacher

In grade 6, acute angle, right angle, obtuse angle, straight angle and reflex angle were identified with the respect to the right angle. In grade 7, static angles and dynamic angles, Naming an angle, measuring units of angles and measuring angles using a protractor are studied. It is very important to improve above skills since it is essential to have the ability of naming angles and identifying the angles named, when learning geometrical concepts in next grades

## Learning Outcome

- Gains an understanding of the concept of static angle by considering certain locations in the environment.
- Gains an understanding of the concept of dynamic angle by considering certain rotations in the environment.

An activity related to these is given below

Refer pages 64 in grade 7 Teachers' Guide.

## Activity 01

### Quality Input

- Copies of annex 9.1 for each group

### Teachers' Role

- Group the students appropriately and distribute an activity sheet for each group
- Ask the students to note down the places where angles can be seen in the environment by observing inside or outside of the classroom.
- Ask the students to classify the angles they have written
- After the classification, explain that the angles whose magnitude can be changed are known as dynamic angles and the angles with a constant magnitude are known as static angles.
- Explain that in dynamic angles there are instances where one arm or both arms can be moved and in static angles any of the angles cannot be moved, using examples.
- Refer the exercise 9.1 on page 91 in the text book

### Students' Role

- Engage in the activity in annex 9.1

### Learning Outcome

- Recognizes that an angle is formed by the intersection of two straight line segments.
- Identifies the arms and the vertex of an angle when a figure of an angle is given.
- Draws various angles using a straight edge and names them.
- Writes down the arms, vertex and the angle when a figure of an angle which has been named is given.

An activity related to these is given below

### Quality Input

- Give an activity sheet for each child

### Teachers' Role

- Engage in the activity as in the activity sheet
- Give instructions for the students according to the note on page numbers 91 and 92 in the text book
- Engage the students in the exercise 9.2 after discussing the answers in the activity

### Students' Role

- Engage in the activity according to the activity sheet 9.2
- Complete the exercise 9.2 in the text book, after completing the activity

### Learning Outcome

- Identifies the protractor as an instrument which is used to measure the magnitude of angles

An activity related to this is given below

## Activity 01

### Quality Input

- A4 sheets
- One copy of activity sheet in annex 9.3 for each group

### Teachers' Role

- Group the students appropriately
- Give one activity sheet for each group
- Engage in the activity as given in the activity sheet in annex 9.3, let the students to observe the  $180^{\circ}$  protractor and introduce all parts
- Refer page numbers 94, 95 in the text book

### Students' Role

- Engage in the activity according to the activity sheet 9.3

### Learning Outcome

- Measures given acute/ obtuse / reflex angles using a protractor.

An activity related to this is given below

## Activity 01

### Quality Input

- $180^{\circ}$  protector
- Activity sheet in annex 9.4

### Teachers' Role

- Give a copy of activity sheet in annex 9.4 and a protractor for each student.
- Ask the students to measure angles and complete the table in the activity sheet. Help and assist the students when necessary
- Engage the students in exercise 9.3 in the text book

### Students' Role

- Measure the angles in the activity sheet and complete the table

### Learning Outcome

- Measures given acute/obtuse/reflex angles using a protractor.
- Draws acute/obtuse/reflex angles of given magnitude using a protractor

An activity related to these is given below

### Activity 01

### Quality Input

- $180^{\circ}$  protector
- Straight edge
- Activity sheet in annex 9.5
- A4 sheets

### Teachers' Role

- Give a copy of activity sheet and protector for student
- Engage in the activity as given in the activity sheet.
- Help and assist the students when necessary
- Give instructions specially when drawing reflex angles
- Engage the students in the exercise 9.4 in the text book
- the students in exercise 9.3 in the text book

### Students' Role

- Engage in the activity as given in the activity sheet

## Activity Sheet

Observe the places in the environment and list out 10 instances where angles can be seen

1.	6.
2.	7.
3.	8.
4.	9.
5.	10.

Write 5 instances out of the above list, where the magnitude of angle does not change

According to the angles you observed write down the angles where the magnitude changes and the reason for that in the table given below

Angles where the magnitude change	Reason for the change of the magnitude

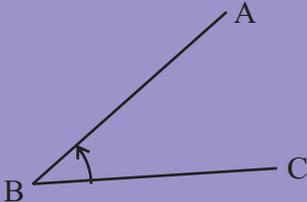
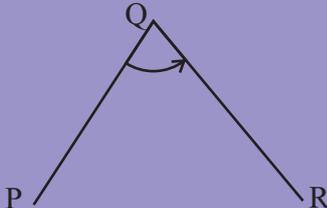
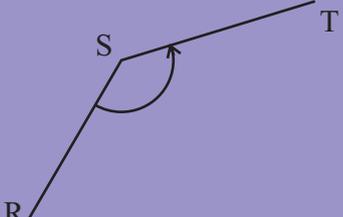
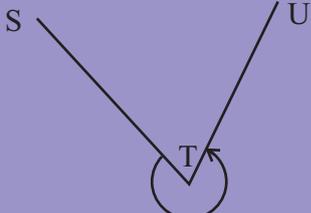
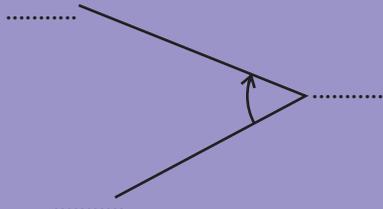
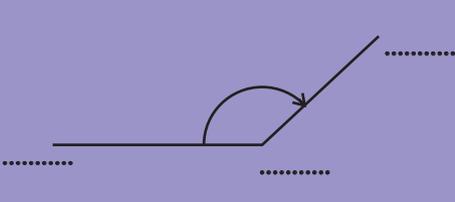
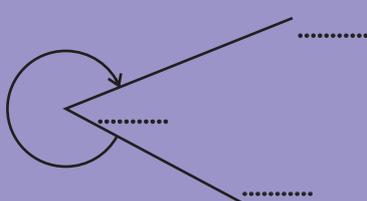
Fill in the blanks using the words static and dynamic appropriately

The angles with no changes of magnitude when moving the arms of angles are ..... angles

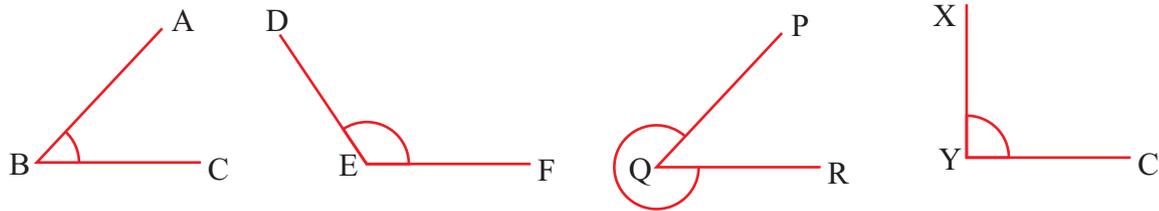
The angles with a change of magnitude when moving one or both arms are ..... angles

### Activity Sheet

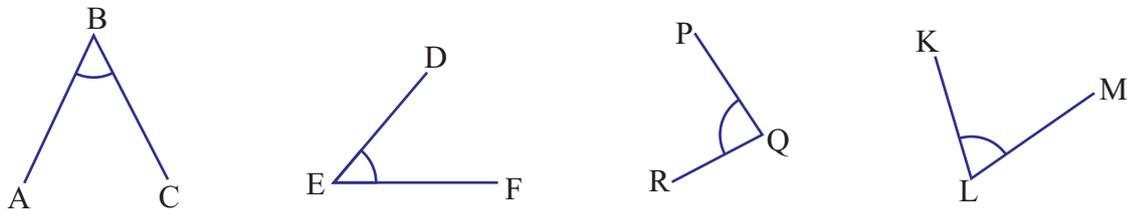
Fill in the blanks according to the given information

	Name of the Angle
<p>1.</p> 	<p>vertex: .....</p> <p>arms : .....</p> <p>angle : ..... or .....</p>
<p>2.</p> 	<p>vertex: .....</p> <p>arms : .....</p> <p>angle : ..... or .....</p>
<p>3.</p> 	<p>vertex: .....</p> <p>arms : .....</p> <p>angle : ..... or .....</p>
<p>4.</p> 	<p>vertex: .....</p> <p>arms : .....</p> <p>angle : ..... or .....</p>
<p>5.</p> 	<p>vertex: Y</p> <p>arms : XY and YZ</p> <p>angle : XYZ or ZXY</p>
<p>6.</p> 	<p>vertex: .M</p> <p>arms : LM and MN</p> <p>angle : LMN or NML</p>
<p>7.</p> 	<p>vertex: T</p> <p>arms : ST and TU</p> <p>angle : STU reflex or UTS reflex</p>

## Activity Sheet



Observe the above angles and name the angles ascending order with respect to the magnitude  
Can you name the angles given below in the ascending order with respect to their magnitude?



The angles can be written in ascending order easily if the magnitudes are given. There are measuring units and equipment to measure length, mass and volume. Likewise it is needed to have a unit and equipment to measure angles

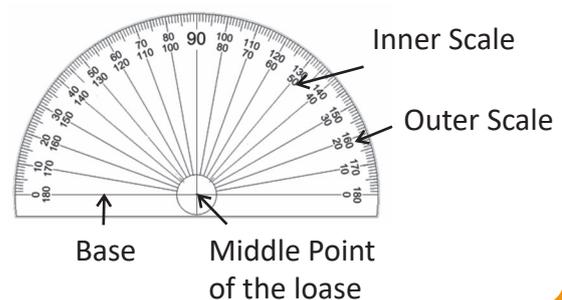
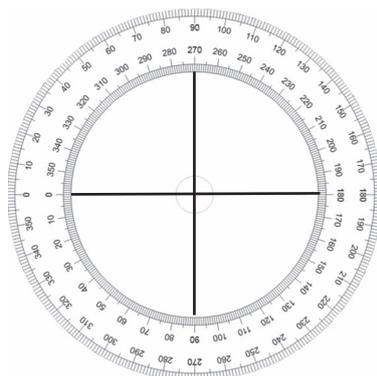
### Measuring angle

#### Unit degree

The angle formed when rotating a straight line a complete round a point is 360°  
20 angle = 200

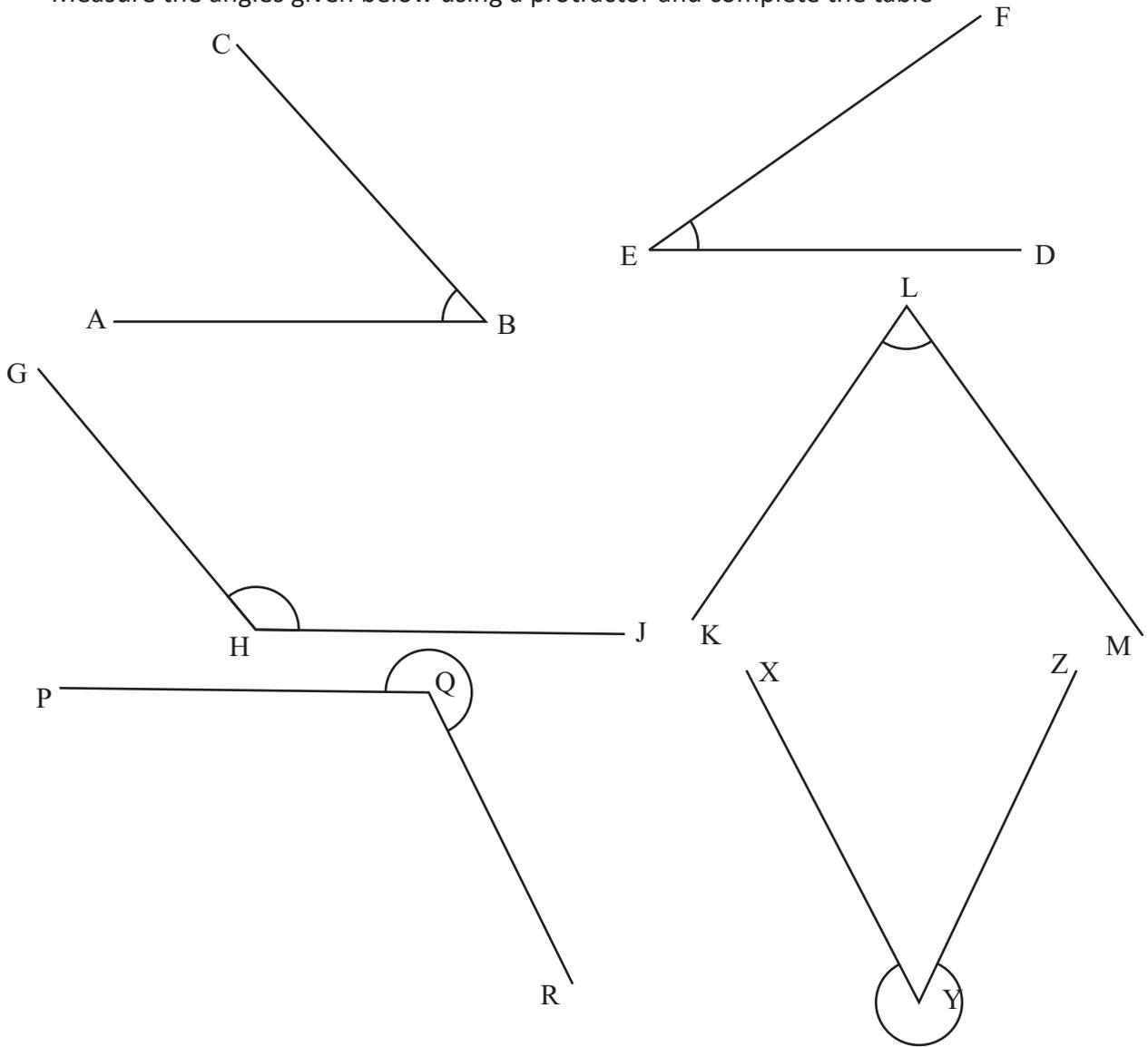
#### Equipment

360° protector  
180° protector



### Activity Sheet

Measure the angles given below using a protractor and complete the table



Angle	Magnitude
$\hat{A}BC$	.....
$\hat{D}EF$	.....
$\hat{G}HJ$	.....
$\hat{K}LM$	.....
$\hat{P}QR$	.....
$\hat{X}YZ$	.....

## Activity Sheet

Draw the angles given in the A4 sheet.

**Competency 3:** Manipulates units and parts of units under the mathematical operations to easily fulfill the requirements of day to day life

**Competency Level 3.1:** Manipulates fractions under the operations of addition and subtraction

**Learning Outcomes-**

- Recognizes that a mixed number consists of a whole number and a proper fraction.
- States those fractions which have a numerator which is greater than or equal to the denominator are improper fractions.
- Converts a mixed number into an improper fraction.
- Converts an improper fraction into a mixed number.
- Compares fractions with unrelated denominators, where the denominator is less than or equal to 12
- States that when two mixed numbers are added or subtracted, simplification can be done either by converting them into improper fractions or by separating out the whole numbers and the proper fractions.
- Adds no more than three numbers consisting of mixed numbers and proper fractions with equal denominators.
- Adds no more than three numbers consisting of mixed numbers and proper fractions with related denominators.
- Adds no more than three numbers consisting of mixed numbers and proper fractions with unrelated denominators.
- Subtracts from a mixed number, a proper fraction with the same denominator.
- Subtracts from a mixed number, a proper fraction with a related denominator.
- Subtracts from a mixed number, a proper fraction with an unrelated denominator.
- Subtracts from a mixed number, a mixed number with the same denominator.
- Subtracts from a mixed number, a mixed number with a related denominator.
- Subtracts from a mixed number, a mixed number with an unrelated denominator.
- Simplifies expressions involving the addition and subtraction of fractions.

**Idea to the teacher**

Knowledge and skills on fractions is the foundation for the subject matters ratio, percentage and decimals. The knowledge on fractions is very important for the day today activities. Therefore pay attention on constructing concepts related to this lesson fractions considering above facts.

## Learning Outcome

- Recognizes that a mixed number consists of a whole number and a proper fraction

Two activities related to this are given below.

Refer page number 70 in the grade 7 Teachers' Guide

## Activity 01

### Quality Input

- Tonic lids.
- Circular laminas which can be pasted on tonic lids with numbers written as given in annex 10.2 (one set for each group).
- Glue.
- Empty vessels (two for each group)

### Teachers' Role

- Paste the circular laminas with numbers written on them as in annex 10.1. Prepare one set for each group.
- Prepare two empty vessels named as 'mixed numbers' and 'improper fractions'.
- Group the students appropriately.
- Give instructions to put the above lids into correct vessel appropriately.
- At the end of the activity observe the way each group has completed the task and confirm the concept

### Students' Role

- Put the tonic lids with numbers into the two vessels 'mixed numbers' and 'improper fractions'.

## Activity 02

### Quality Input

- Flannel board or a similar board.
- Cards as given in annex 10.2
- Cards with answers written as mixed numbers.
- Cards with proper fractions and whole numbers relevant to these mixed numbers.

### Teachers' Role

- Group the students appropriately.
- Prepare cards with events in annex 10.2 and cards with answer according to the given events.
- Display the 5 events on the flannel board.
- Let each group present the answer cards in front of the event.
- Give instructions to display the above answer.
- Correct the incorrect answers after students display them. At the end, confirm that answers obtained for each event are mixed numbers and they are formed by combining a whole number and a proper fraction

### Students' Role

- Find the answer for the event you obtained and display the card with the correct answer on the flannel board.
- Display the whole number and the proper fraction relevant to the answer in front of the answer.
- Suggest a common name for the answer you obtained for each event.

### Learning Outcome

- States those fractions which have a numerator which is greater than or equal to the denominator are improper fractions

An activity related to this is given below.

## Activity 01

### Quality Input

- Cards which can be pasted on the flannel board, with fractions written on them relevant to group A and B.

• Group A  $\frac{5}{2}$   $\frac{1}{2}$   $\frac{4}{3}$   $\frac{8}{6}$   $\frac{3}{2}$   $\frac{5}{5}$   $\frac{3}{4}$   $\frac{2}{2}$   $\frac{2}{5}$

• Group B

12 cards written  $\frac{1}{2}$  , 5 cards written  $\frac{1}{3}$

4 cards written  $\frac{1}{4}$  , 8 cards written  $\frac{1}{5}$

8 cards written  $\frac{1}{6}$

### Teachers' Role

- Put the cards in group A into a box named A and keep cards in group B on a table.
- Separate the flannel board into two parts and name them as proper fractions and fractions which are not proper.
- Randomly select a student and ask to take one card from box A and paste on the relevant part of the flannel board.
- Repeat this until no cards in the box.
- Discuss and correct, if a student face any difficulty when separating proper and improper fractions.
- Ask the students to suggest a name for the fractions which are not proper and confirm that we name it as improper fractions.
- Arrange the improper fractions properly on the board and ask the students to construct each improper fraction as an addition of unit fractions which are given in group B.

### Students' Role

- According to the instruction of the teacher take one card from box A and display it on the relevant part of the board.
- Suggest a name for 'fractions which are not proper'
- Arrange the above fractions which are not proper as an addition of unit fractions using the cards on the table

## Learning Outcome

- Converts a mixed number into an improper fraction.
- Converts an improper fraction into a mixed number.

Three activities related to this are given below.

### Activity 01

## Quality Input

- Sets of cards and copies of annex 10.4

## Teachers' Role

- Group the students appropriately.
- Distribute a copy of annex 10.4 and set of cards as given in annex 10.4 for each group.
- Engage the students in the activity.
- At the end of the activity, explain the brief method of converting a mixed number into a improper fraction as given

## Students' Role

- Engage in the activity according to the instructions given by the teacher.

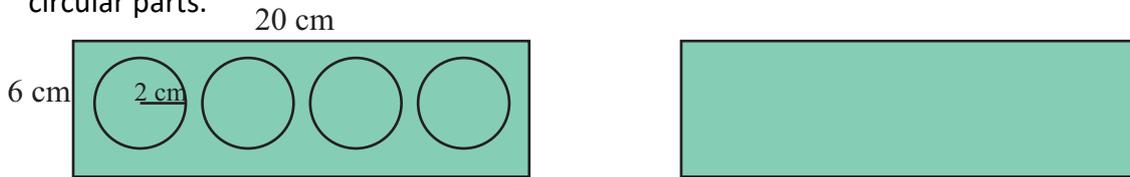
### Activity 02

## Quality Input

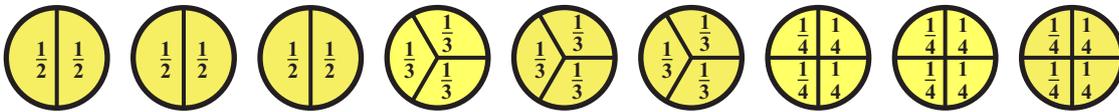
- Bristol boards in two colours.
- Scissors.
- Glue

## Teachers' Role

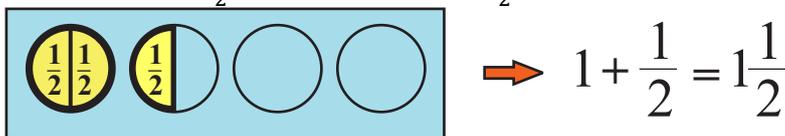
- Cut 2 rectangles with 20cm in length and 6cm in breadth from the Bristol boards.
- Draw 4 circles with radius 2cm, in one rectangle and cut and separate the circular parts.



- Now paste the remaining part of the rectangle on the other rectangle.
- Using another britol board with a different colour cut circular laminas with radius 1.9cm. Now separate the circular laminas as given below. Write the relevant fraction on each part and cut and separate.



- Ready the above materials and group the students appropriately.
- Distribute one board and a set of circular parts for each group and engage the students in the activity.
- Write improper fraction  $\frac{3}{2}$  on the board.
- Let the students form  $\frac{3}{2}$  on the board using halves.
- Since 1 circle and  $\frac{1}{2}$  of a circle is completed on the board, confirm that  $\frac{3}{2}$  is equal to the addition of 1 and  $\frac{1}{2}$  and it is known as  $1\frac{1}{2}$
- Use the above board and repeat this activity for the fractions such as  $\frac{5}{2}$   $\frac{4}{3}$   $\frac{7}{3}$   $\frac{5}{4}$  and  $\frac{11}{4}$
- Write the relevant mixed number in front of each instance.
- At the end explain that  $\frac{5}{2} = 5 \div 2 = 2\frac{1}{2}$
- Since 1 circle and  $\frac{1}{2}$  of a circle is completed on the board, confirm that  $\frac{3}{2}$  is equal to the addition of 1 and  $\frac{1}{2}$  and it is known as  $1\frac{3}{2}$



- Use the above board and repeat this activity for the fractions such as  $\frac{5}{2}$   $\frac{4}{3}$   $\frac{7}{3}$   $\frac{5}{4}$  and  $\frac{11}{4}$
- Write the relevant mixed number in front of each instance.
- Finely explain the approach of  $\frac{5}{2} = 5 \div 2 = 2\frac{1}{2}$  using each incident
- Engage the students in the exercise 10.1 in the text book.

### Students' Role

- Arrange the improper fraction given by the teacher using relevant circular parts with unit fractions.

### Activity 03

#### Quality Input

- Copies of annex 10.5 and 10.6
- Bristol board.
- Glue.
- Scissors

#### Teachers' Role

- Photo copy annex 10.5 and 10.6 in colour sheets and paste on a Bristol board cut and separate the circular parts by cutting through the radii.
- Group the students appropriately and give a set of cards for each group. Ask them to match the numbers appropriately.

### Students' Role

- Observe the numbers on the cards you obtained.
- Match equal numbers and keep the cards adjoining the edges

#### Learning Outcome

- Compares fractions with unrelated denominators, where the denominator is less than or equal to 12

Two activities related to this are given below.

### Activity 01

#### Quality Input

- Thick cardboard.
- Straight edge, Nut and bolts.
- Colour felt pens or marker pens.

### Teachers' Role

- Prepare strips of cardboard as given in annex 10.7 (Divide each strip into equal parts).
- Join all the strips using nut and bolt.
- Give one such equipment for each group.
- Write the two fractions on the board that must be compared.
- Give instructions to separate the two strips of boards relevant to the denominator of the fractions.
- Let the student compare the two fractions considering the lengths of the strips.

### Students' Role

- Select the larger fraction out of the two fractions mentioned by the teacher, using the strips considering the denominator of the fractions.

### Activity 02

### Quality Input

- Copies of annex 10.8
- Colours

### Teachers' Role

- Group the students appropriately and give a copy of annex 10.8 for each group.
- Let the students colour the portions relevant to each fraction in each square and compare them using the symbol ' $<$ ' or ' $>$ '

### Students' Role

- In obtained colour the relevant portions according to the fractions in each square.
- Observe the shaded region and compare the two fractions by writing the appropriate symbol ' $>$ ' or ' $<$ ' in the blank.

### Learning Outcome

- States that when two mixed numbers are added or subtracted, simplification can be done either by converting them into improper fractions or by separating out the whole numbers and the proper fractions.
- Adds no more than three numbers consisting of mixed numbers and proper fractions with equal denominators.
- Subtracts from a mixed number, a proper fraction with the same denominator.
- Subtracts from a mixed number, a mixed number with the same denominator.

Two activities related to these are given below.

## Activity 01

### Quality Input

- Copies of annex 10.9
- Bristol board or card board

### Teachers' Role

- Prepare a set of circular laminas with 3cm radius as given below,
  - 8 numbers of circular laminas
  - 4 numbers of half circles
  - 4 numbers of 1/4 circles
  - 6 numbers of 1/3 circles
- Group the students appropriately and give a copy of annex 10.9 and prepared set of cards for each group
- As mentioned in students role, let students to observe the way of finding the solution of  $2\frac{1}{3} + 1\frac{1}{3}$ .
- Give teacher's assistance if necessary
- According to that let students to do annex 10.9

### Students' Role

- Observe the way of finding the addition of  $2\frac{1}{3}$  and  $1\frac{1}{3}$  using circular laminas given below

$$\begin{aligned}
 2\frac{1}{3} + 1\frac{1}{3} &= \text{Two full circles and one 1/3 circle} + \text{One full circle and one 1/3 circle} \\
 &= \text{Three full circles and two 1/3 circles} \\
 &= 1+1+1 + \frac{1}{3} + \frac{1}{3} \\
 &= 3 + \frac{2}{3} \\
 &= 3\frac{2}{3}
 \end{aligned}$$

- Observe the way of finding solution in two methods

Separating whole numbers and proper fraction	Converting to mixed fraction
$  \begin{aligned}  &2\frac{1}{3} + 1\frac{1}{3} \\  &= 2 + 1 + \frac{1}{3} + \frac{1}{3} \\  &= 3 + \frac{2}{3} \\  &= 3\frac{2}{3}  \end{aligned}  $	$  \begin{aligned}  &2\frac{1}{3} + 1\frac{1}{3} \\  &= \frac{7}{3} + \frac{4}{3} \\  &= \frac{11}{3} \\  &= 3\frac{2}{3}  \end{aligned}  $

- Use circular laminas to find the solution of questions in annex 10.9

## Activity 02

### Quality Input

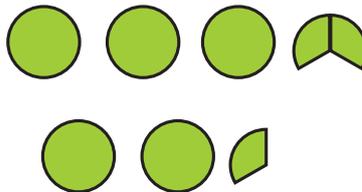
- Copies of annex 10.10
- Bristol board or card board

### Teachers' Role

- Prepare a set of circular laminas with 3cm radius as given below,
  - 8 numbers of circular laminas
  - 4 numbers of half circles
  - 4 numbers of  $1/4$  circles
  - 6 numbers of  $1/3$  circles
- Group the students appropriately and give a copy of annex 10.9 and prepared set of cards for each group
- As mentioned in students role, let students to observe the way of finding the solution of  $3\frac{2}{3} - 1\frac{1}{3}$ .
- Give teacher's assistance if necessary
- According to that let students to do annex 10.10

### Students' Role

- Observe the way of finding the solution of  $3\frac{2}{3} - 1\frac{1}{3}$  using circular laminas given below
- Arrange  $3\frac{2}{3}$  using circular laminar



- After remove  $1\frac{1}{3}$  from  $3\frac{2}{3}$
- Then the answer is  $2\frac{1}{3}$
- Observe the way of finding solution in two methods

Separating whole numbers and proper fraction	Converting to mixed fraction
$3\frac{2}{3} - 1\frac{1}{3}$ $= (3-1) + \left(\frac{2}{3} - \frac{1}{3}\right)$ $= 2 + \frac{1}{3}$ $= 2\frac{1}{3}$	$3\frac{2}{3} - 1\frac{1}{3}$ $= \frac{11}{3} - \frac{4}{3}$ $= \frac{7}{3}$ $= 2\frac{1}{3}$

- Use circular laminas to find the solution of questions in annex 10.10

## Learning Outcome

- Adds no more than three numbers consisting of mixed numbers and proper fractions with related denominators.
- Subtracts from a mixed number, a proper fraction with a related denominator
- Subtracts from a mixed number, a mixed number with a related denominator

An activity related to this is given below.

## Activity 02

## Quality Input

- Copies of annex 10.11
- A4 sheets

## Teachers' Role

- Group students four in each
- Let students to read and understand the activity provided in students' role
- Distribute activity sheets(annex 10.11) and A4 sheets as necessary
- Give instructions if necessary

## Students' Role

- When subtracting and adding fraction, if denominators are not equal can be use equivalent fractions to make them similar.
- While discussing identify a method of solving below examples within the group

$$\begin{aligned} &1\frac{1}{2} + 1\frac{1}{4} \\ &= (1+1) + \left(\frac{1}{2} + \frac{1}{4}\right) \\ &= 2 + \left(\frac{1 \times 2}{2 \times 2} + \frac{1}{4}\right) \\ &= 2 + \left(\frac{2}{4} + \frac{1}{4}\right) \\ &= 2 + \frac{2+1}{4} \\ &= 2 + \frac{3}{4} \\ &= 2\frac{3}{4} \end{aligned}$$

$$\begin{aligned} &1\frac{1}{2} + 1\frac{1}{4} \\ &= \frac{3}{2} + \frac{5}{4} \\ &= \frac{3 \times 2}{2 \times 2} + \frac{5}{4} \\ &= \frac{6}{4} + \frac{5}{4} \\ &= \frac{11}{4} \\ &= 2\frac{3}{4} \end{aligned}$$

$$\begin{aligned} &2\frac{2}{3} - 1\frac{1}{6} \\ &= (2-1) + \left(\frac{2}{3} - \frac{1}{6}\right) \\ &= 1 + \left(\frac{4}{6} - \frac{1}{6}\right) \\ &= 1 + \frac{4-1}{6} \\ &= 1 + \frac{3}{6} \\ &= 1 + \frac{1}{2} \\ &= 1\frac{1}{2} \end{aligned}$$

$$\begin{aligned} &2\frac{2}{3} - 1\frac{1}{6} \\ &= \frac{8}{3} - \frac{7}{6} \\ &= \frac{16}{6} - \frac{7}{6} \\ &= \frac{9}{6} \\ &= \frac{3}{2} \\ &= 1\frac{1}{2} \end{aligned}$$

- According to the given instruction solved the problems in annex 10.11

## Learning Outcome

- Adds no more than three numbers consisting of mixed numbers and proper fractions with unrelated denominators
- Subtracts from a mixed number, a proper fraction with an unrelated denominator
- Subtracts from a mixed number, a mixed number with an unrelated denominator.
- Simplifies expressions involving the addition and subtraction of fractions.

An activity related to these is given below.

## Activity 01

### Quality Input

- Copies of annex 10.12
- A4 sheets

### Teachers' Role

- Group students not more than four in each
- Let students to read and understand the activity provided in students' role
- Distribute activity sheets(annex 10.12) and A4 sheets as necessary
- Advise students to solve them using given A4 sheets
- Engage students in the exercises 10.4, 10.5 and 10.6 in Grade 7 textbook

### Students' Role

- While discussing identify a method of solving below examples within the group
- According to the given instruction solved the problems in annex 10.11

1)  $1\frac{1}{2} + 1\frac{1}{3}$

$$\begin{aligned} & 1\frac{1}{2} + 1\frac{1}{3} \\ &= (1+1) + \left(\frac{1}{2} + \frac{1}{3}\right) \\ &= 2 + \left(\frac{1 \times 3}{2 \times 3} + \frac{1 \times 2}{3 \times 2}\right) \\ &= 2 + \left(\frac{3}{6} + \frac{2}{6}\right) \\ &= 2 + \frac{5}{6} \\ &= 2\frac{5}{6} \end{aligned}$$

$$\begin{aligned} & 1\frac{1}{2} + 1\frac{1}{3} \\ &= \frac{3}{2} + \frac{4}{3} \\ &= \frac{9}{6} + \frac{8}{6} \\ &= \frac{9+8}{6} \\ &= \frac{17}{6} \\ &= 2\frac{5}{6} \end{aligned}$$

## Students' Role ctn

$$2) \quad 2\frac{2}{3} + 1\frac{1}{4}$$

$$\begin{aligned} & 2\frac{2}{3} - 1\frac{1}{4} \\ &= (2-1) + \left(\frac{2}{3} - \frac{1}{4}\right) \\ &= 1 + \left(\frac{8}{12} - \frac{3}{12}\right) \\ &= 1 + \frac{8-3}{12} \\ &= 1 + \frac{5}{12} \\ &= 1\frac{5}{12} \end{aligned}$$

$$\begin{aligned} & 2\frac{2}{3} - 1\frac{1}{4} \\ &= \frac{8}{3} - \frac{5}{4} \\ &= \frac{32}{12} - \frac{15}{12} \\ &= \frac{17}{12} \\ &= 1\frac{5}{12} \end{aligned}$$

$$2) \quad 1\frac{1}{2} + 1\frac{2}{3} + 1\frac{3}{4}$$

$$\begin{aligned} & 1\frac{1}{2} + 1\frac{2}{3} - 1\frac{3}{4} \\ &= (1+1-1) + \left(\frac{1}{2} + \frac{2}{3} - \frac{3}{4}\right) \\ &= 1 + \left(\frac{6}{12} + \frac{8}{12} - \frac{9}{12}\right) \\ &= 1 + \left(\frac{6+8-9}{12}\right) \\ &= 1 + \frac{5}{12} \\ &= 1\frac{5}{12} \end{aligned}$$

$$\begin{aligned} & 1\frac{1}{2} + 1\frac{2}{3} - 1\frac{3}{4} \\ &= \frac{3}{2} + \frac{5}{3} - \frac{7}{4} \\ &= \frac{18}{12} + \frac{20}{12} - \frac{21}{12} \\ &= \frac{18+20-21}{12} \\ &= \frac{19}{12} \\ &= 1\frac{5}{12} \end{aligned}$$

## Activity sheet

$$\frac{4}{4}$$

$$1\frac{4}{4}$$

$$3\frac{3}{4}$$

$$2\frac{2}{5}$$

$$2\frac{3}{7}$$

$$\frac{1}{2}$$

$$\frac{7}{4}$$

$$\frac{12}{7}$$

$$\frac{7}{3}$$

$$\frac{17}{13}$$

$$\frac{7}{7}$$

$$\frac{12}{11}$$

$$2\frac{3}{5}$$

$$\frac{5}{5}$$

$$\frac{20}{8}$$

$$\frac{4}{3}$$

$$\frac{17}{9}$$

$$3\frac{1}{3}$$

$$3\frac{1}{13}$$

$$\frac{8}{8}$$

$$\frac{11}{11}$$

$$2\frac{4}{9}$$

$$\frac{1}{1}$$

$$\frac{10}{10}$$

$$2\frac{5}{12}$$

$$1\frac{7}{15}$$

$$3\frac{3}{6}$$

$$\frac{1}{13}$$

$$5$$

$$\frac{3}{7}$$

$$\frac{1}{8}$$

$$1\frac{3}{4}$$

Lochana's mother gave 3 apples with equal size to Lochana. He divided the 3 apples among his sister and himself equally. Find the amount each receive.

Teacher brought 2 cakes with equal size. She distributed one cake and  $\frac{3}{4}$  of the other cake among the students. What is total amount of cake distributed among the students.

Lasith had 4 square shaped laminas with equal size . He coloured 3 laminas completely and  $\frac{1}{4}$  of the other lamina. Find the toral amount of square shaped laminas coloured.

There were 3 oranges with equal size. Mother used 2 oranges and half of the remaining orange to make an orange juice. What is the total amount of oranges used for the orange juice.

Out of 5 papaws with equal size 4 papaws and  $\frac{1}{3}$  of the other papaw was used to prepare a fruit salad. Find the total amount of papaws used for the salad.

Annex 10.3

Mixed Numbers

$$1\frac{1}{2}$$

$$1\frac{3}{4}$$

$$2\frac{1}{2}$$

$$3\frac{3}{4}$$

$$4\frac{1}{3}$$

Whole Numbers and Proper fractions

$$1$$

$$\frac{1}{2}$$

$$1$$

$$\frac{3}{4}$$

$$2$$

$$\frac{1}{2}$$

$$3$$

$$\frac{1}{4}$$

$$4$$

$$\frac{1}{3}$$

## Activity sheet

$$\textcircled{1} \quad 1\frac{1}{2} = 1 + \frac{1}{2}$$

$$= \boxed{\phantom{00}} + \frac{1}{2}$$

$$= \boxed{\phantom{00}}$$

$$\textcircled{2} \quad 2\frac{2}{3} = 2 + \frac{2}{3}$$

$$= 1 + 1 + \frac{2}{3}$$

$$= \boxed{\phantom{00}} + \boxed{\phantom{00}} + \frac{2}{3}$$

$$= \boxed{\phantom{00}}$$

$$\textcircled{3} \quad 2\frac{3}{4} = 2 + \frac{3}{4}$$

$$= 1 + 1 + \frac{3}{4}$$

$$= \boxed{\phantom{00}} + \boxed{\phantom{00}} + \frac{3}{4}$$

$$= \boxed{\phantom{00}}$$

$$\textcircled{4} \quad 3\frac{4}{5} = 3 + \frac{4}{5}$$

$$= 1 + 1 + 1 + \frac{4}{5}$$

$$= \boxed{\phantom{00}} + \boxed{\phantom{00}} + \boxed{\phantom{00}} + \frac{4}{5}$$

$$= \boxed{\phantom{00}}$$

$$\frac{2}{2}$$

$$\frac{3}{2}$$

$$\frac{3}{3}$$

$$\frac{3}{3}$$

$$\frac{8}{3}$$

$$\frac{4}{4}$$

$$\frac{4}{4}$$

$$\frac{11}{4}$$

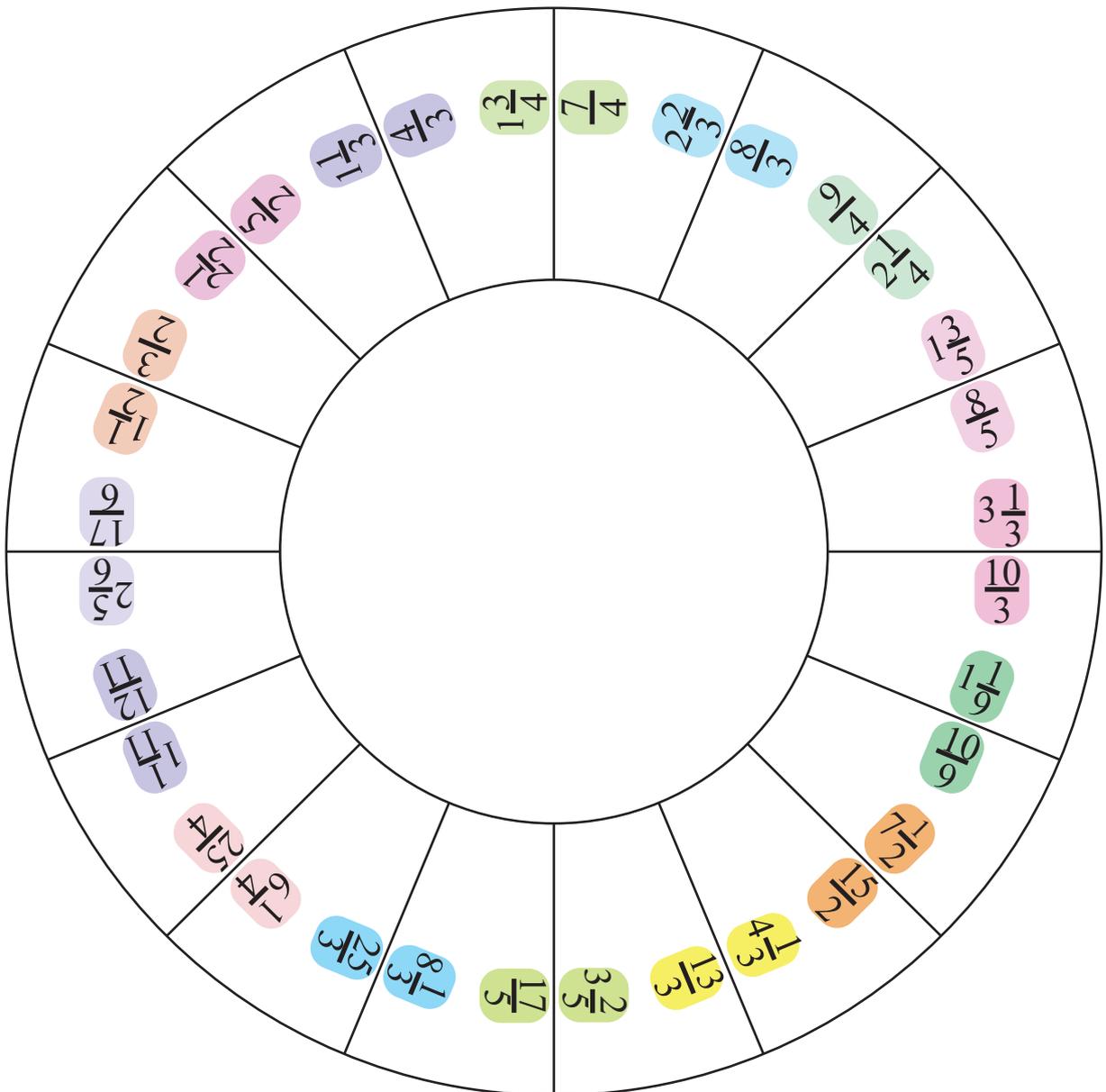
$$\frac{5}{5}$$

$$\frac{5}{5}$$

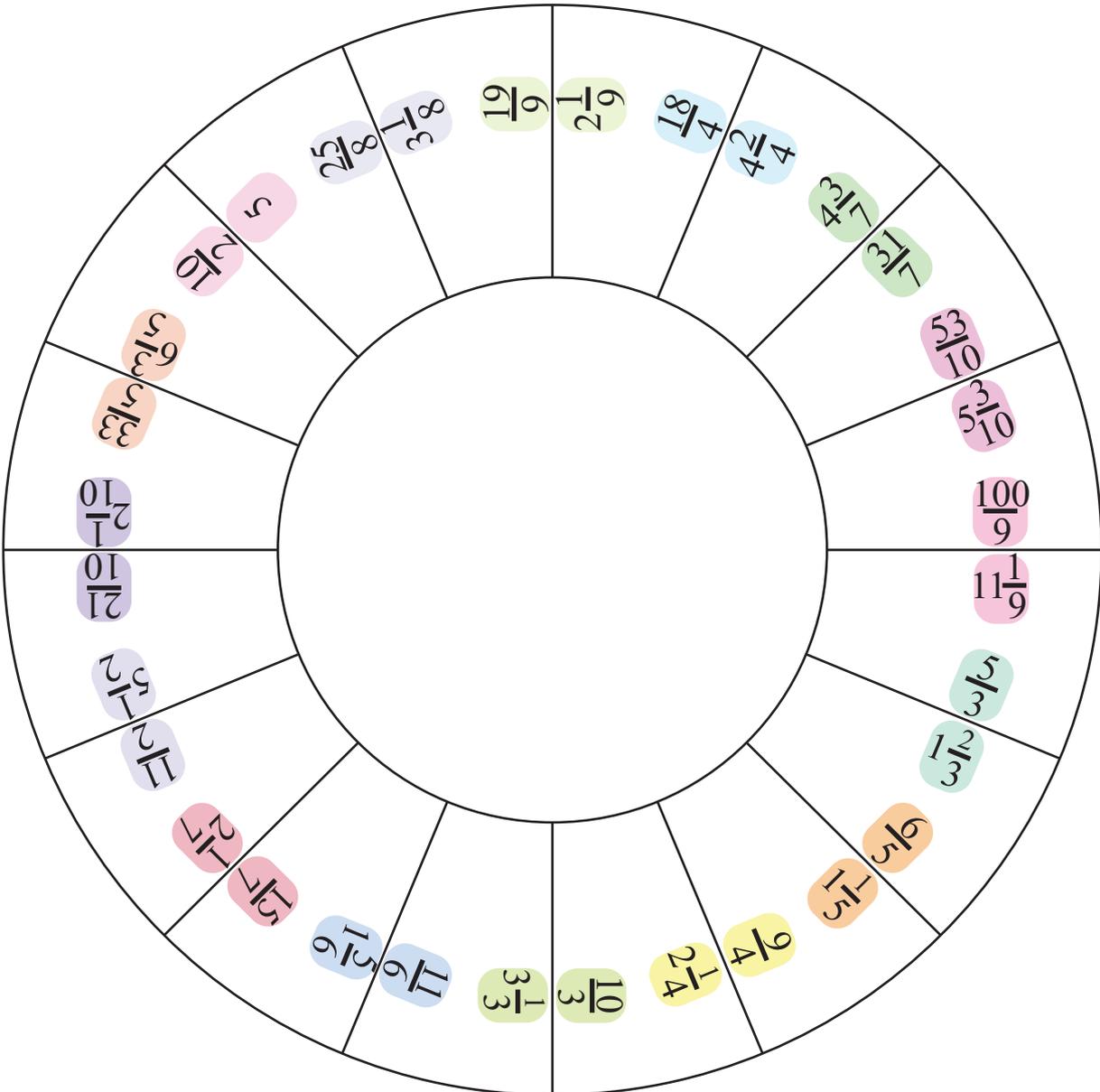
$$\frac{5}{5}$$

$$\frac{19}{5}$$

## Activity sheet



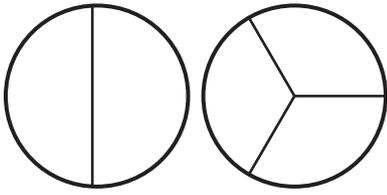
## Activity sheet



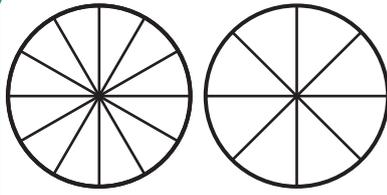
## Activity sheet

●	<b>1</b>											
●	$\frac{1}{2}$						$\frac{1}{2}$					
●	$\frac{1}{4}$			$\frac{1}{4}$			$\frac{1}{4}$			$\frac{1}{4}$		
●	$\frac{1}{3}$				$\frac{1}{3}$				$\frac{1}{3}$			
●	$\frac{1}{6}$											
●	$\frac{1}{12}$											
●	$\frac{1}{8}$											
●	$\frac{1}{5}$			$\frac{1}{5}$			$\frac{1}{5}$			$\frac{1}{5}$		
●	$\frac{1}{10}$											
●	$\frac{1}{9}$											
●	$\frac{1}{7}$											
●	$\frac{1}{11}$											

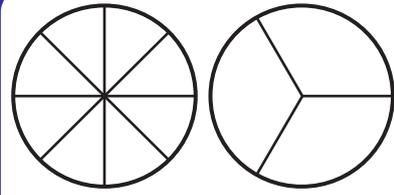
## Activity sheet



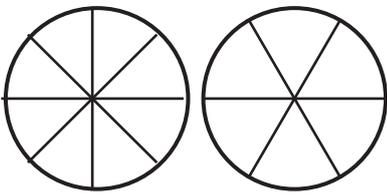
$$\frac{1}{2} \quad \text{[orange dashed rectangle]} \quad \frac{1}{3}$$



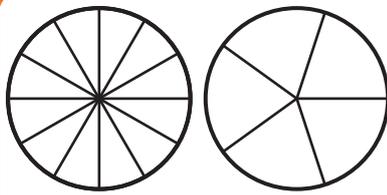
$$\frac{5}{12} \quad \text{[green dashed rectangle]} \quad \frac{4}{8}$$



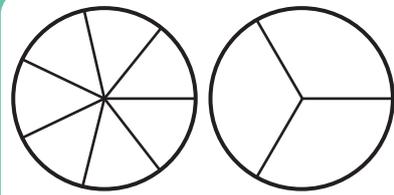
$$\frac{2}{8} \quad \text{[blue dashed rectangle]} \quad \frac{1}{3}$$



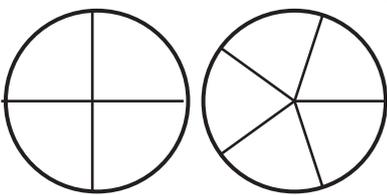
$$\frac{3}{8} \quad \text{[light green dashed rectangle]} \quad \frac{5}{6}$$



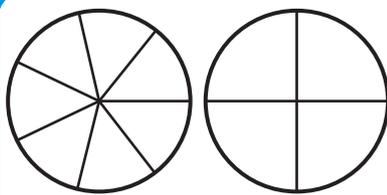
$$\frac{3}{12} \quad \text{[purple dashed rectangle]} \quad \frac{2}{5}$$



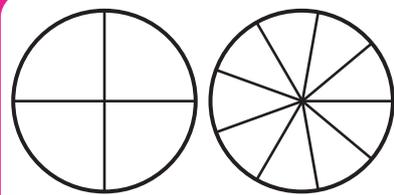
$$\frac{5}{7} \quad \text{[pink dashed rectangle]} \quad \frac{1}{3}$$



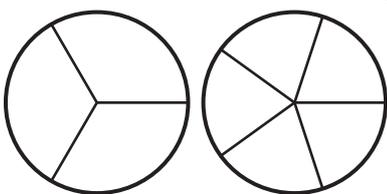
$$\frac{3}{4} \quad \text{[purple dashed rectangle]} \quad \frac{4}{5}$$



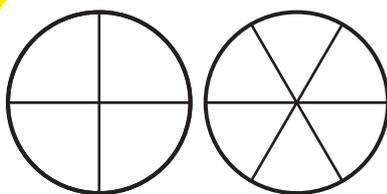
$$\frac{3}{7} \quad \text{[light green dashed rectangle]} \quad \frac{1}{4}$$



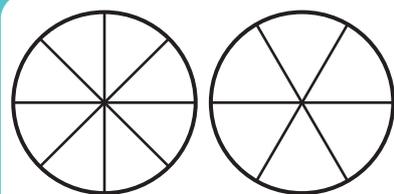
$$\frac{3}{4} \quad \text{[yellow dashed rectangle]} \quad \frac{5}{9}$$



$$\frac{2}{3} \quad \text{[pink dashed rectangle]} \quad \frac{2}{5}$$



$$\frac{1}{4} \quad \text{[yellow dashed rectangle]} \quad \frac{5}{6}$$



$$\frac{4}{8} \quad \text{[purple dashed rectangle]} \quad \frac{3}{6}$$

Find the answers by organizing given circular laminas and fill the blanks according to that

(1)  $1\frac{1}{3} + \frac{1}{3}$

$$\begin{aligned} & 1\frac{1}{3} + \frac{1}{3} \\ & = 1 + \frac{\ominus}{3} + \frac{\ominus}{3} \\ & = 1 + \frac{\square}{\square} \\ & = \frac{\square}{\square} \end{aligned}$$

$$\begin{aligned} & 1\frac{1}{3} + \frac{1}{3} \\ & = \frac{4}{3} + \frac{1}{3} \\ & = \frac{\ominus}{3} \\ & = \frac{\square}{\square} \end{aligned}$$

(2)  $2\frac{1}{4} + 1\frac{1}{4} + 3\frac{1}{4}$

$$\begin{aligned} & 2\frac{1}{4} + 1\frac{1}{4} + 3\frac{1}{4} \\ & = 2 + 1 + \frac{\ominus}{4} + \frac{\ominus}{4} + \frac{\ominus}{4} \\ & = \square + \frac{\square}{4} \\ & = \frac{\square}{\square} \end{aligned}$$

$$\begin{aligned} & 2\frac{1}{4} + 1\frac{1}{4} + 3\frac{1}{4} \\ & = \frac{9}{4} + \frac{\ominus}{4} + \frac{\ominus}{4} \\ & = \frac{\square}{4} \\ & = \frac{\square}{\square} \end{aligned}$$

(3)  $1\frac{1}{2} + 2\frac{1}{2}$

$$\begin{aligned} & 1\frac{1}{2} + 2\frac{1}{2} \\ & = \square + \square + \frac{\ominus}{\square} + \frac{\ominus}{\square} \\ & = \square + \frac{\square}{\square} \\ & = \square + \square \\ & = \square \end{aligned}$$

$$\begin{aligned} & 1\frac{1}{2} + 2\frac{1}{2} \\ & = \frac{\ominus}{2} + \frac{\ominus}{2} \\ & = \frac{\square}{2} \\ & = \square \end{aligned}$$

Find the answers by organizing given circular laminas and fill the blanks according to that

(1)  $2\frac{2}{3} - \frac{1}{3}$

$$\begin{aligned} & 2\frac{2}{3} - \frac{1}{3} \\ & = 2 + \left( \frac{2}{3} - \frac{\ominus}{\square} \right) \\ & = \square + \frac{\square}{\square} \\ & = \square \frac{\square}{\square} \end{aligned}$$

$$\begin{aligned} & 2\frac{2}{3} - \frac{1}{3} \\ & = \frac{\ominus}{3} - \frac{\ominus}{3} \\ & = \frac{\square}{3} \\ & = \square \frac{\square}{\square} \end{aligned}$$

(2)  $3\frac{3}{4} - 1\frac{1}{4}$

$$\begin{aligned} & 3\frac{3}{4} - 1\frac{1}{4} \\ & = (3-1) + \left( \frac{\ominus}{4} - \frac{\ominus}{4} \right) \\ & = 2 + \frac{\square}{4} \\ & = 2 \frac{\square}{\square} \\ & = 2 \frac{\square}{2} \end{aligned}$$

$$\begin{aligned} & 3\frac{3}{4} - 1\frac{1}{4} \\ & = \frac{\ominus}{4} - \frac{\ominus}{4} \\ & = \frac{\square}{4} \\ & = \square \frac{\square}{4} \\ & = \square \frac{\square}{2} \end{aligned}$$

(3)  $2 - \frac{1}{2}$

$$\begin{aligned} & 2 - \frac{1}{2} \\ & = 1 + 1 - \frac{1}{2} \\ & = 1 + \frac{2}{2} - \frac{1}{2} \\ & = 1 + \frac{\ominus}{2} \\ & = \square + \frac{\square}{2} \end{aligned}$$

$$\begin{aligned} & 2 - \frac{1}{2} \\ & = \frac{4}{2} - \frac{\ominus}{2} \\ & = \frac{\square}{2} \\ & = 1 \frac{\square}{2} \end{aligned}$$

Find the answers while discussing among group as mentioning student role

$$(1) \quad 2\frac{1}{3} + 1\frac{5}{6}$$

$$(2) \quad 1\frac{1}{2} + 1\frac{1}{4} + 1\frac{1}{8}$$

$$(3) \quad 1\frac{1}{3} + 1\frac{5}{6} + 1\frac{1}{12}$$

$$(4) \quad 1 + 1\frac{3}{5} + 2\frac{1}{10}$$

$$(5) \quad 2\frac{5}{6} - 1\frac{2}{3}$$

$$(6) \quad 1\frac{7}{8} - \frac{1}{4}$$

$$(7) \quad 2\frac{3}{4} - 1\frac{7}{12}$$

$$(8) \quad 2 - 1\frac{1}{3}$$

Find the answers while discussing among group as mentioning student role

$$(1) \quad 1\frac{2}{3} + 1\frac{1}{2}$$

$$(2) \quad 1\frac{1}{3} + 1\frac{1}{2} + \frac{1}{4}$$

$$(3) \quad 1\frac{5}{6} + 1\frac{2}{3} + 1\frac{1}{8}$$

$$(4) \quad 1 + 1\frac{2}{3} + 2\frac{3}{4}$$

$$(5) \quad 2\frac{2}{3} - \frac{1}{4}$$

$$(6) \quad 3\frac{5}{6} + 1\frac{3}{4}$$

$$(7) \quad 1\frac{2}{3} + 1\frac{3}{4} - 1\frac{1}{2}$$

$$(8) \quad 1\frac{2}{3} + 1\frac{1}{2} - 1\frac{3}{4}$$

# 11 Decimals

**Competency 3 :** Manipulates units and parts of units under the mathematical operations to fulfill the requirements of day today life easily

**Competency Level 3.2** Manipulates decimals under the operations of multiplication and division

## Learning Outcomes-

- Converts into decimals, the fractions that can be converted into terminating decimals.
- Converts a terminating decimal into a fraction and writes it in its simplest form.
- Multiplies a decimal number by powers of 10.
- Divides a decimal number by powers of 10.
- Multiplies a decimal number by a whole number.
- Divides a decimal number by a whole number.
- Solves problems related to decimals

## Idea to the teacher

The students have identified decimals in grade 6 and they have the ability of addition and subtraction of decimals and converting fractions with denominator hundred into a decimal In this lesson converting a fraction, Which is a finite decimal, into a decimal, multiplying and dividing a decimal by a power of 10 and a whole number and solving problems related to decimals are discussed. Students must have an idea about equivalent fractions

## Learning Outcome

- Converts into decimals, the fractions that can be converted into terminating decimals.

An activity related to this is given below.

## Activity 01

### Quality Input

- 1 Bristol board for each group.
- Sets of A,B,C card as in annex 11.1 (one for each group)
- Glue

### Teachers' Role

- Prepare three boxes and name them A,B,C for each group with sets of cards written fractions and decimals in annex 11.1
- Group the students appropriately.
- Distribute a Bristol board, glue and three boxes A,B,C for each group.
- Give common instructions given in 'Students' Role'
- Guide for the presentations.

### Students' Role

- Take out a card from box A and then find another card from Box B with an equivalent for the fraction in hand. Now find a decimal number from box C which is equal to the fraction.
- Paste the three cards on the Bristol board using '=' symbol.
- Get ready for a presentation about the method of converting a fraction into a decimal number.

### Learning Outcome

- Converts a terminating decimal into a fraction and writes it in its simplest form.

An activity for these is given below.

## Activity 01

### Quality Input

- Circular laminas with fractions and decimals written on them as in annex 11.2
- Copies of the table in annex 11.3
- Tonic lids, Glue

### Teachers' Role

- Prepare sets of tarsia puzzle using 11.4.1, 11.4.2, 11.4.3
- Group students appropriately and distribute sets of puzzles among the group

### Students' Role

- Study the decimal numbers and fractions written on the tonic lids.
- Complete the decimal number column in the table (Annex 11.3) using the decimal numbers written on tonic lids.
- Separate the tonic lids, completing the other columns in the table. ( the decimal number written first with the relevant fractions as one group)

### Learning Outcome

- Multiplies a decimal number by powers of 10

An activity for this is given below

### Activity 01

### Quality Input

- Copies of puzzles.(one for each group)
- Bristol board, Glue , Scissors

### Teachers' Role

- Photocopy Tarzia puzzles in annex 11.4
- Paste the puzzle on the board draw or paste a big picture on the back side before separating into triangles. It makes easy to find out the accuracy of the puzzle by looking back side of it.
- Group the students and distribute puzzle.

### Students' Role

- Do the activity according to the teacher's instructions

## Activity Sheet

## Box A

$$\frac{1}{2}$$

$$\frac{3}{4}$$

$$1\frac{3}{5}$$

$$\frac{3}{8}$$

$$1\frac{7}{40}$$

## Box B

$$\frac{5}{10}$$

$$\frac{75}{100}$$

$$\frac{160}{100}$$

$$\frac{375}{1000}$$

$$\frac{1175}{1000}$$

## Box C

$$0.5$$

$$0.75$$

$$1.6$$

$$0.375$$

$$1.175$$

## Activity Sheet

$$\frac{5}{10}$$

$$\frac{1}{2}$$

$$\frac{1}{5}$$

$$\frac{2}{10}$$

$$\frac{8}{10}$$

$$\frac{4}{5}$$

$$\frac{3}{5}$$

$$\frac{6}{10}$$

$$\frac{3}{10}$$

$$\frac{3}{10}$$

$$\frac{25}{100}$$

$$\frac{1}{4}$$

$$\frac{11}{10}$$

$$1\frac{1}{10}$$

$$\frac{5}{100}$$

$$\frac{1}{20}$$

$$\frac{25}{10}$$

$$2\frac{1}{2}$$

$$\frac{125}{100}$$

$$1\frac{1}{4}$$

**Activity Sheet**

Convert the decimal numbers to a fraction with the denominator 10 and its simplest form.

Decimal Number

Fraction with the denominator 10

Simplest Form

$$0.2 = \boxed{\phantom{00}} = \boxed{\phantom{00}}$$

$$0.3 = \boxed{\phantom{00}} = \boxed{\phantom{00}}$$

$$0.5 = \boxed{\phantom{00}} = \boxed{\phantom{00}}$$

$$0.6 = \boxed{\phantom{00}} = \boxed{\phantom{00}}$$

$$0.8 = \boxed{\phantom{00}} = \boxed{\phantom{00}}$$

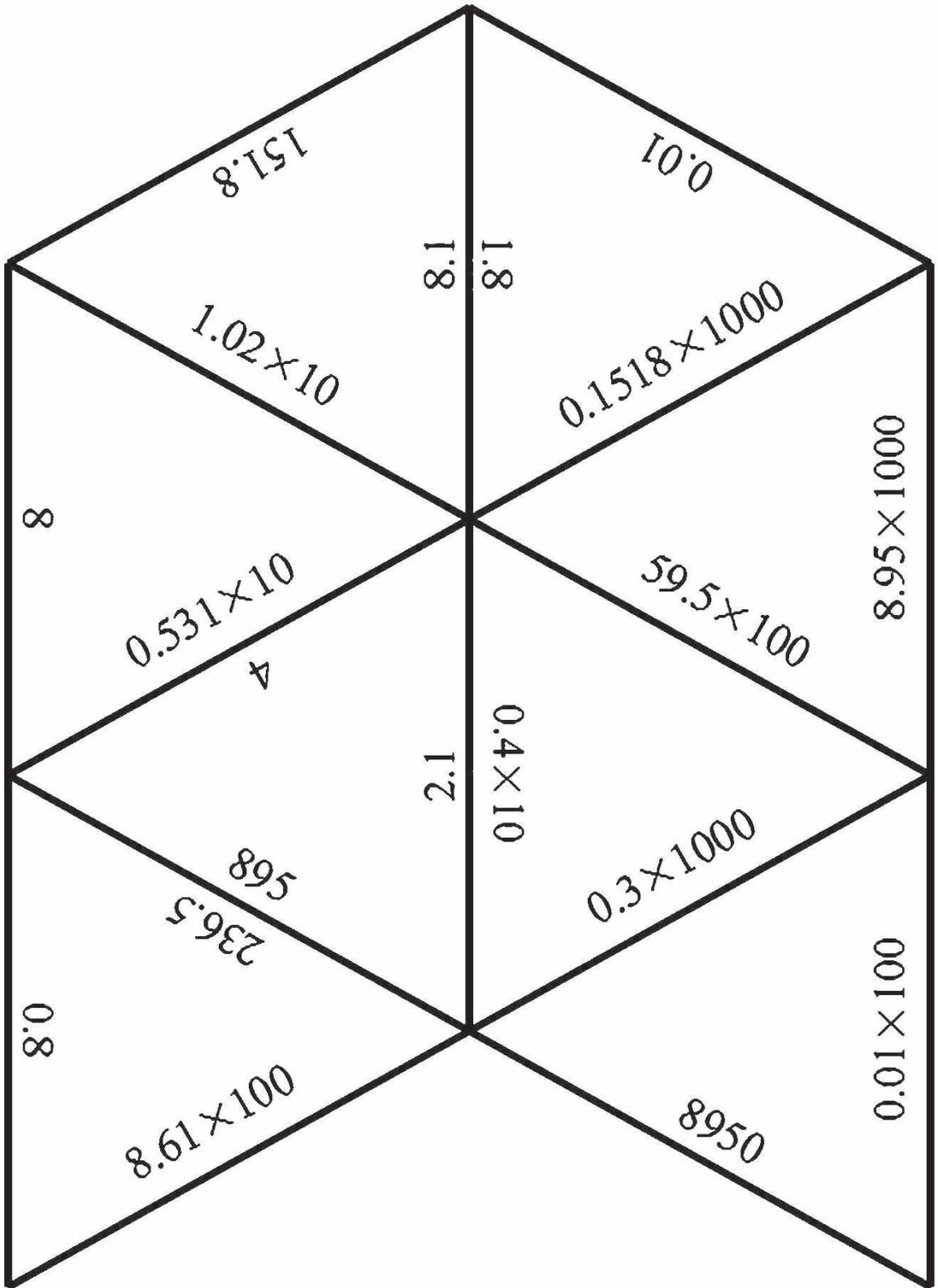
$$0.25 = \boxed{\phantom{00}} = \boxed{\phantom{00}}$$

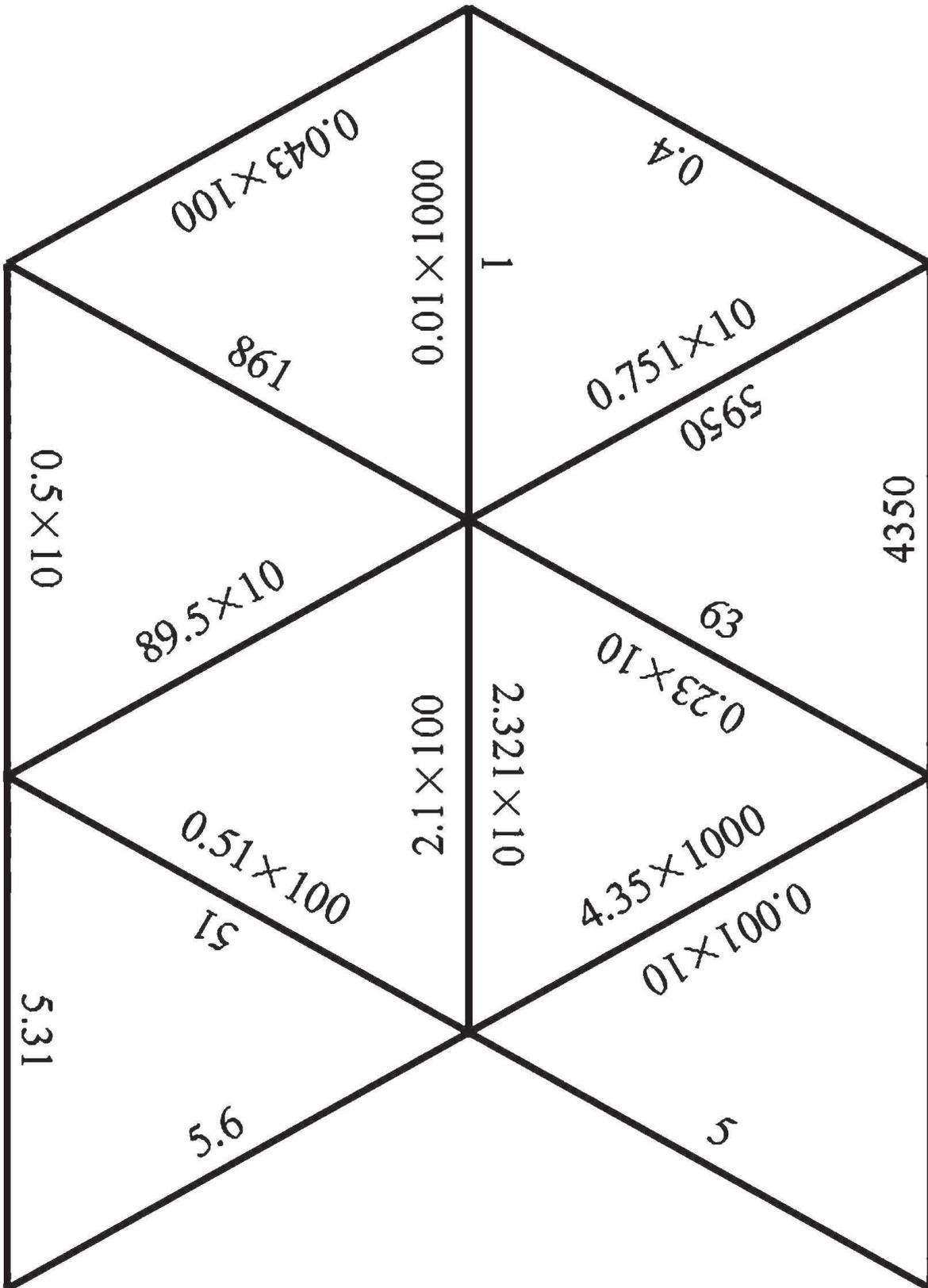
$$0.1 = \boxed{\phantom{00}} = \boxed{\phantom{00}}$$

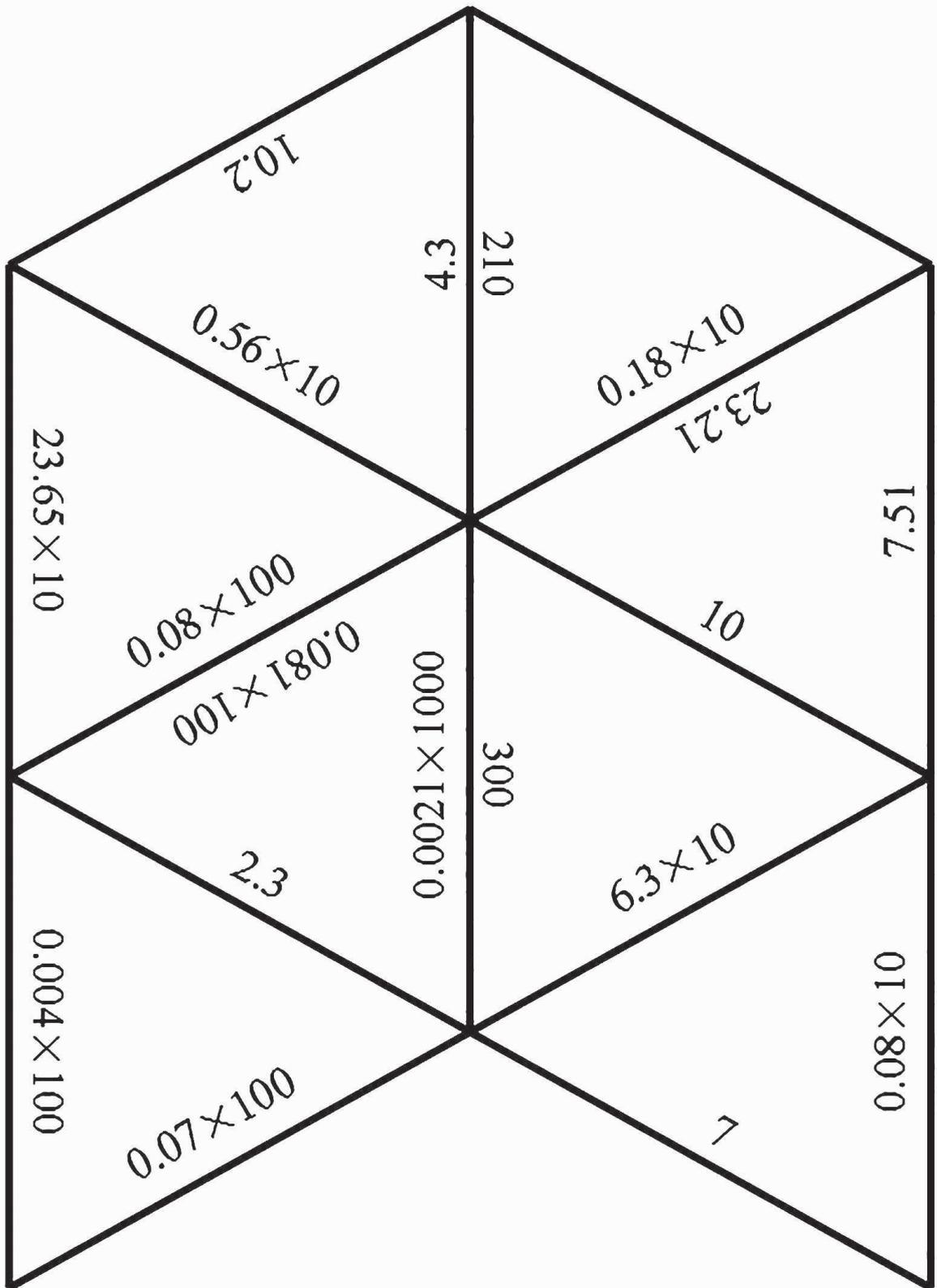
$$1.1 = \boxed{\phantom{00}} = \boxed{\phantom{00}}$$

$$1.25 = \boxed{\phantom{00}} = \boxed{\phantom{00}}$$

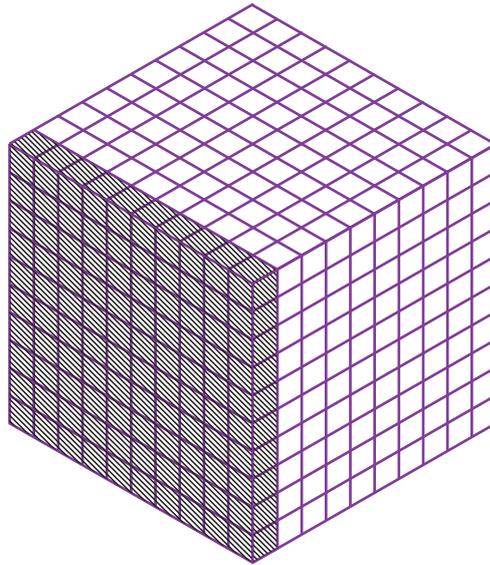
$$2.5 = \boxed{\phantom{00}} = \boxed{\phantom{00}}$$





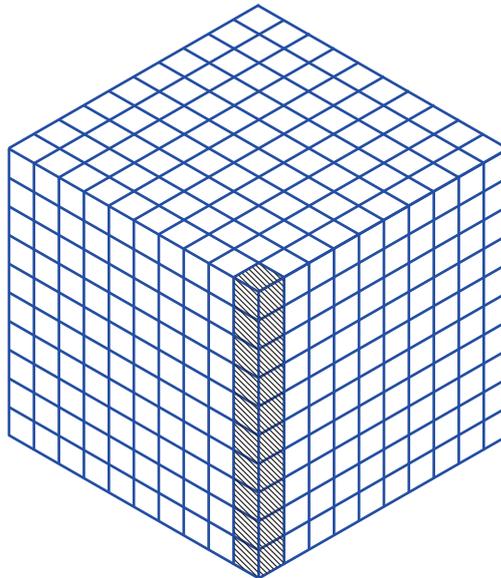


For part I



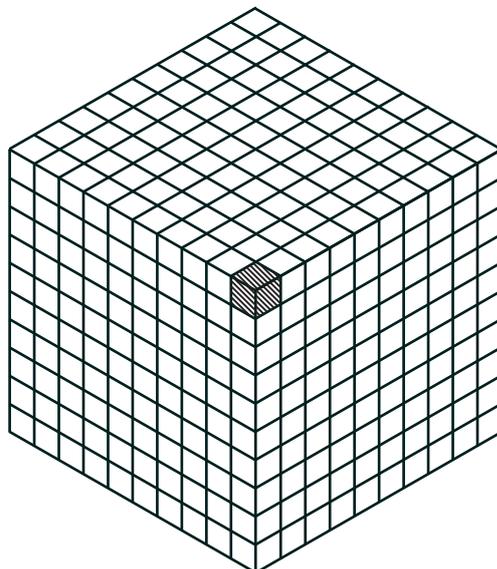
Layer 1

For part II



Rod 1

For part III



Cube 1



## Activity Sheet

### Part I

How many parts( layers) in the cube as shaded part?

The shaded part mention as a fraction of all parts

Convert it in to a decimal value

Then complete the following table

How many parts( layers) in the cube as shaded part (layer)	As a fraction	As a decimal
3	$\frac{3}{10}$	0.3
5		
7		
9		

### Part I

How many parts( rods) in the cube as shaded part?

The shaded part mention as a fraction of all parts

Convert it in to a decimal value

Then complete the following table

	How many parts (rods) in the cube as shaded part (rod)	As a fraction	As a decimal
1.	3	$\frac{3}{100}$	0.03
2.	12		
3.	25		
4.	45		
5.	85		

## Activity Sheet

### Part III

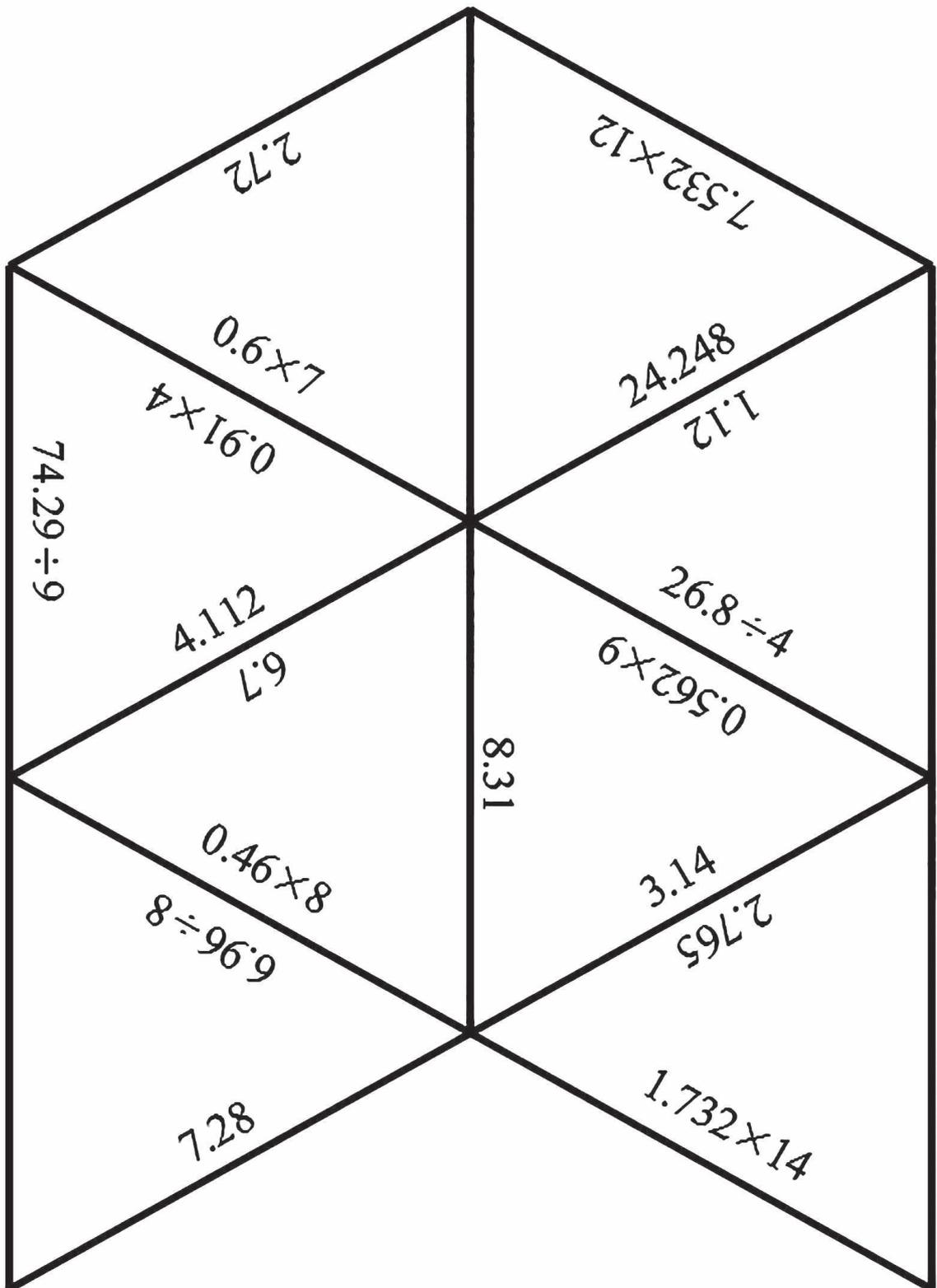
How many parts (small cubes) in the cube as shaded part?

The shaded part mention as a fraction of all parts

Convert it in to a decimal value

Then complete the following table

	How many parts (small cubes) in the cube as shaded part (small cube)	As a fraction	As a decimal
1.	5		
2.	15		
3.	48		
4.	153		
5.	250		
6.	155		



$3.64$	$24.672 \div 6$	$3.68$	$65.52 \div 9$
$6.72 \div 6$	$2.4$	$8 \times 43.0$	$90.384$
$19.355 \div 7$	$850.5$	$21.98 \div 7$	
$0.87$			

### Activity Sheet

- 1) Weight of a gift is 72.5kg. Then what is the weight of 10 gifts?
- 2) What is the length of the building if the building has four class rooms and the length of a class room is 3.8m?
- 3) What is the length of a piece, if 50.72 m length cabal is cut in to equal 10 pieces?
- 4) Length of a ribbon is 3m. What is the length of one piece, if it cut in to equal 8 pieces?
- 5) What is the weight of 100 sags, if weight of sag is 28.4kg?
- 6) Area of a floor tile is a 900.25cm<sup>2</sup>. Find the area of the floor which has 25 tiles.
- 7) A rectangular floor area of a building is 150.75m<sup>2</sup>. Find the number of tiles to cover that floor, which has area of 3 m<sup>2</sup> .
- 8) The length of a side in square shape flower bed is 8.74m. What is the necessary length of barbed cable to cover twice surrounded it?

## 12 Algebraic Expressions

**Competency 14** : Simplifies algebraic expressions by systematically exploring various methods.

**Competency Level 14.1:** Constructs algebraic expressions using all four mathematical operations

**Learning Outcomes-**

- Constructs using only one mathematical operation, linear algebraic expressions in one unknown, with integral coefficients.
- Constructs, using several mathematical operations, linear algebraic expressions in one unknown, with integral coefficients.
- Describes a linear algebraic expression in one unknown in words
- Constructs using only one mathematical operation, linear algebraic expressions in one unknown, with fractional coefficients.
- Constructs using several mathematical operations, linear algebraic expressions in one unknown, with fractional coefficients
- Constructs using only one mathematical operation, linear algebraic expressions in two unknowns, with integral coefficients.
- Constructs using several mathematical operations, linear algebraic expressions in two unknowns, with integral coefficients.
- Constructs using only one mathematical operation, linear algebraic expressions in two unknowns, with fractional coefficients.
- Constructs using several mathematical operations, linear algebraic expressions in two unknowns with fractional coefficients

**Competency Level 14.2:** Simplifies algebraic expressions containing like and unlike terms

**Learning Outcomes-**

- Separates the like terms and unlike terms in a set of algebraic terms.
- Identifies the coefficient of an algebraic term.
- Adds several linear like terms together.
- Subtracts a term with a positive coefficient from a like term with a positive coefficient such that the answer has a positive coefficient.
- Simplifies a linear algebraic expression containing like and unlike terms, such that the answer has positive coefficients.
- Multiplies a linear algebraic term with a positive integral coefficient by a positive whole number.
- Finds the value of an algebraic expression of the form  $ax+b$ , where  $a \in \mathbb{Z}^+$  and  $b \in \mathbb{Z}$ , by substituting a whole number for  $x$ .
- Finds the value of an algebraic expression of the form  $ax + by + c$  where  $a, b, c \in \mathbb{Z}$  and  $a, b \neq 0$  by substituting whole numbers for  $x$  and  $y$ .

## Idea to the teacher

In grade 6, constructing algebraic expressions where the coefficient of the unknown term is 1 and finding the value of an algebraic expression by substituting whole number values for the unknowns were learned. In this lesson, more about algebraic expressions are studied. Since the knowledge and skills of algebraic expressions are important in day to day life, it is better to use examples from real world experience

## Learning Outcome

- Constructs using only one mathematical operation, linear algebraic expressions in one unknown, with integral coefficients.

An activity for these is given below

## Activity 01

## Quality Input

- Copies of annex 12.1

## Teachers' Role

- Paste a copy of annex 12.1 on a Bristol board and cut and separate the cards
- Group the students appropriately and distribute a set of cards for each group
- Give instructions to match the three cards figure, algebraic expressions and descriptions
- Display each figure cut from an enlarged annex 12.1 and lead a discussion about the relevant algebraic expression about the relevant algebra expression and the description
- Engage the students in the exercise 12.1 on page number 146 – 147 in the text book

## Students' Role

- Engage in the activity according to the instructions given by the teacher
- Engage in the exercise 12.1 on page 146, 147 in the text book

## Learning Outcome

- Constructs, using several mathematical operations, linear algebraic expressions in one unknown, with integral coefficients.

An activity to this is given below

## Activity 01

### Quality Input

- Copies of annex 12.2

### Teachers' Role

- Give a copy of annex 12.2 to each student
- Engage the students in the activity
- Pay attention on page numbers 76 – 79 in Teachers' Guide

### Students' Role

- Fill in the blanks in the blanks in the activity sheets and construct algebraic expressions for the lengths

### Learning Outcome

- Describes a linear algebraic expression in one unknown in words

An activity for these is given below

## Activity 01

### Quality Input

- Copies of annex 12.3
- Glue

### Teachers' Role

- Group the students appropriately
- Distribute copies of annex 12.3 for each group
- Engage the students in the activity
- Refer page number 76 - 79 in the Teachers' Guide

### Students' Role

- Match the algebraic expression with the worded explanation and complete the activity sheet by pasting card with worded expression accurately

## Learning Outcome

- Constructs using several mathematical operations, linear algebraic expressions in one unknown, with fractional coefficients
- Constructs using only one mathematical operation, linear algebraic expressions in two unknowns, with integral coefficients

An activity for these is given below

## Activity 01

## Quality Input

- Copies of annex 12.4
- Stripes of papers
- Glue
- Scissors

## Teachers' Role

- Prepare strips of papers mentioned the length as 'a' and 'x' . Prepare another set of papers with length 5cm and 2cm.
- Group the students appropriately and engage in the activity
- Engage the students in exercise 12.2 on page numbers 149 and 150 in the text book

## Students' Role

- Complete the activity according to the teachers instructions
- Complete the exercises 12.2 on page number 149 and 150 in the text book

## Learning Outcome

- Constructs using only one mathematical operation, linear algebraic expressions in two unknowns, with fractional coefficients.
- Constructs using several mathematical operations, linear algebraic expressions in two unknowns with fractional coefficients

An activity related to these is given below

## Activity 01

### Quality Input

- Copies of annex 12.5

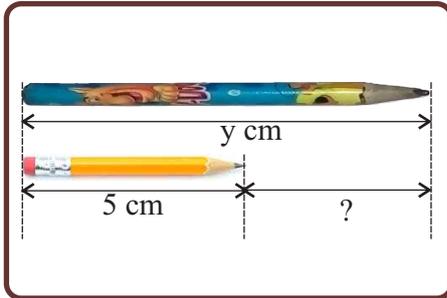
### Teachers' Role

- Group the students appropriately
- Distribute the annex 12.5 for each group
- Engage the students in the activity
- Appoint the students to do the exercise 12.3 on page numbers 151 and 152 in the text book

### Students' Role

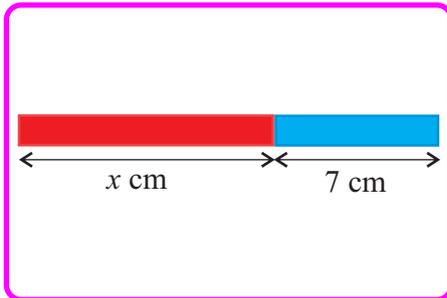
- Complete the activity according to the teachers instructions
- Complete the exercises 12.3 on page number 151 and 152 in the text book

## Activity Sheet



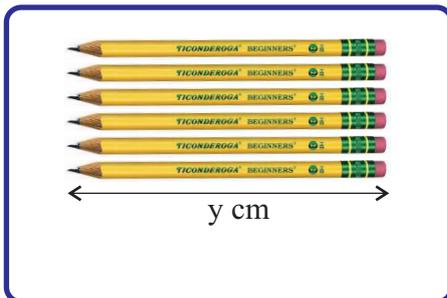
$$y - 5$$

Length of a pencil is 5cm. There is another pencil with length 'y' cm which is longer than it. Find the difference between the length of two pencils



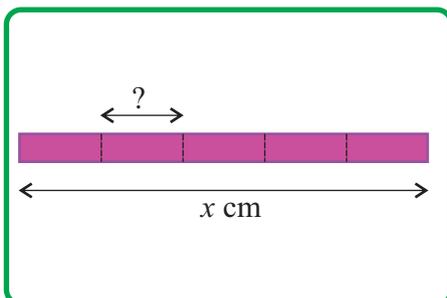
$$x + 7$$

Length of red ribbon is xcm and the length of blue ribbon is 7cm. Find the total of both ribbons



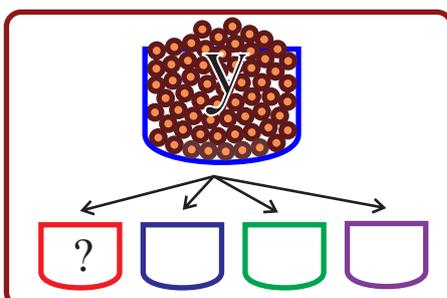
$$5 \times y = 5y$$

Length of a pencil is 5cm. What is the total length of such pencils?



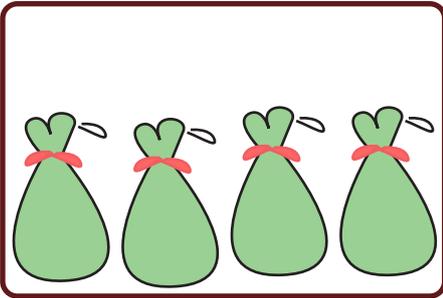
$$x \div 5 = \frac{x}{5}$$

Length of a ribbon is xcm. Find the length of one piece, if it is divided into 5 pieces



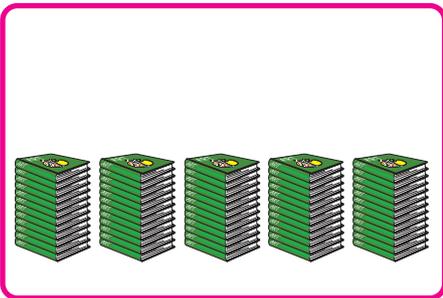
$$y \div 4 = \frac{y}{4}$$

There are y numbers of balls inside a container. How many balls are there in one container if these balls are divided into 4 containers



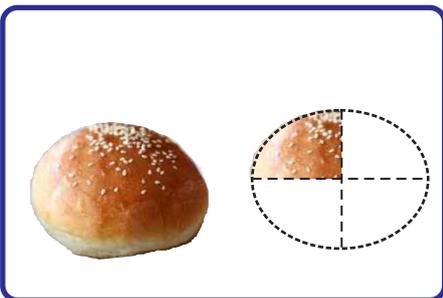
$$4 \times y = 4y$$

There are  $y$  numbers of balls in a bag. What is the total number of balls in all bags



$$5 \times x = 5x$$

Find the total number of books in 5 piles of books, if there are number of books in one pile



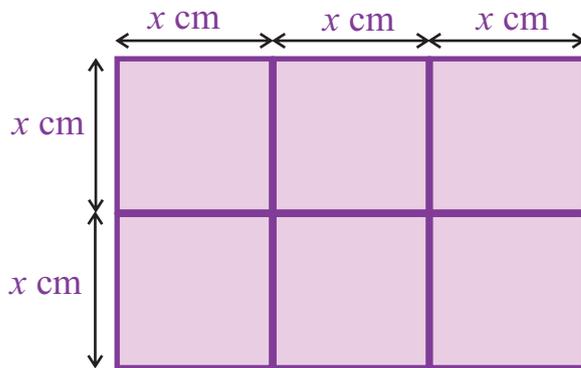
$$x \div 4 = \frac{x}{4}$$

Mass of a bun is  $x$ . Find the mass of one part, if a bun is divided into four parts

## Activity Sheet

Fill the blanks and construct the algebraic expressions

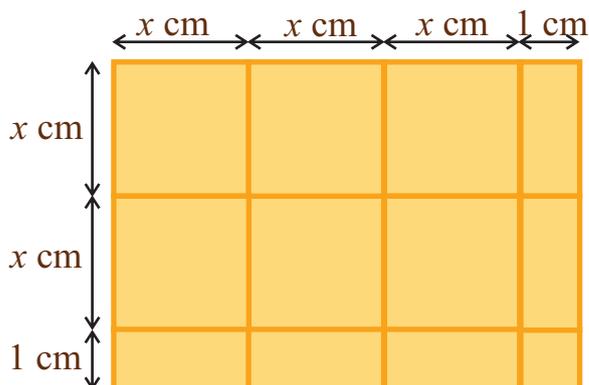
- 1 given below is made using square shaped laminas of one side  $x$  cm



$$\begin{aligned} \text{Length} &= 3 \times x \\ &= 3x \end{aligned}$$

$$\begin{aligned} \text{Breadth} &= \text{---} \times \text{---} \\ &= \text{---} \end{aligned}$$

- 2 In the rectangular lamina which is made using the laminas given below



$$\begin{aligned} \text{Length} &= 3 \times \text{---} + 1 \\ &= 3x + 1 \end{aligned}$$

$$\begin{aligned} \text{Breadth} &= \text{---} \times \text{---} + \text{---} \\ &= \text{---} + \text{---} \\ &= \text{---} \end{aligned}$$

- 3 There are 'a' number of balls in a bag. Five such bags and another 10 balls are taken to the pavilion



$$\begin{aligned} \text{Remain number} &= \text{---} + \text{---} \\ \text{of balls} &= \text{---} \end{aligned}$$

- 4 ) There are two bags each having 'a' number of balls. 7 balls are removed. Find the remain number of balls



$$\begin{aligned} \text{Remain number of balls} &= \text{---} - \text{---} \\ &= \text{---} \end{aligned}$$

### Activity Sheet

Match the statement to the algebraic expression given below and past the tatement under each expression

$$2x + 5$$

$$20y - 6$$

$$5x + 2$$

$$4y + 20$$

$$20 - 4y$$

$$5y + 3$$

$$3x + 5$$

$$20 - 5x$$

5 more than twice the value of x

4 less than 20 times the value of y

2 more than 5 times the value of x

20 more than 4 times the value of y

4 times the value of y subtract from y

5 times of the value of x subtract from 20

5 more than 3 times the value of x

3 more than five times the value of y

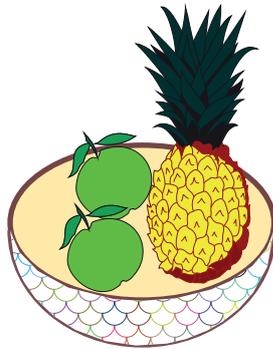
## Activity Sheet

Using the strips of papers given,

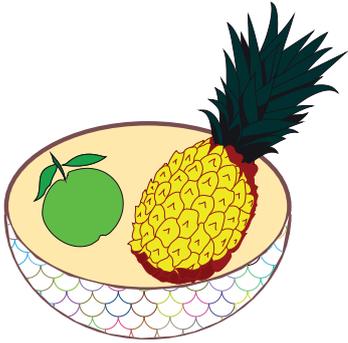
1. Take a strip of paper of length ' $a$ '. Divide it into 2 equal parts. Paste one part here. Write an algebraic expression for the length of that portion
  
  
  
  
  
  
  
  
  
  
2. Take a strip of paper of length ' $x$ '. Separate it into 4 equal parts. Take one portion and remove 2cm from it. Paste the remaining portion here. Write an algebraic expression for the length of that portion
  
  
  
  
  
  
  
  
  
  
3. Take a strip of paper of length ' $a$ '. Divide it to 8 equal parts. Cut one part of it and paste it together with a stripe paper of 5cm in length. Write an algebraic expression for the total length of pasted portion
  
  
  
  
  
  
  
  
  
  
4. Take two strips of papers with length 2cm and length ' $x$ ' cm . Divide the strip of paper with  $x$  in length into 3 parts. Paste one part of it with the strip of paper 2 cm in length . Write an algebraic expression for the total length

### Activity Sheet

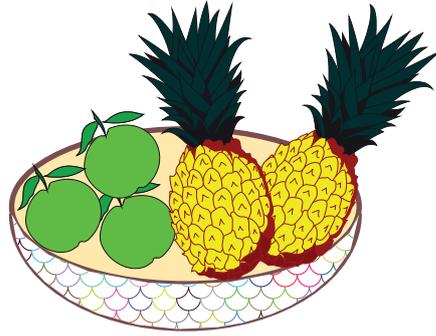
The price of an orange is Rs.  $x$ . The price of a pineapple is Rs.  $y$ . Write an algebraic expression for the total cost of the basket of fruits



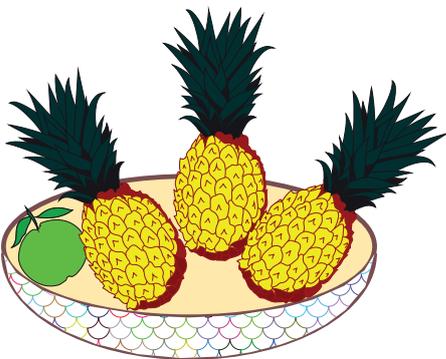
$$2 \times x + y \\ = 2x + y$$



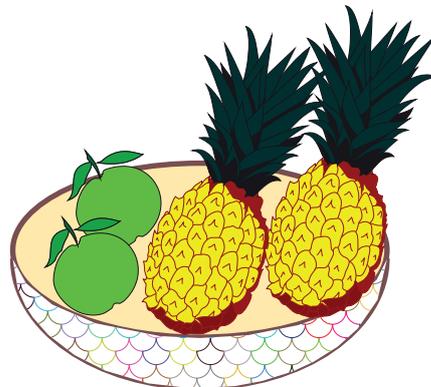
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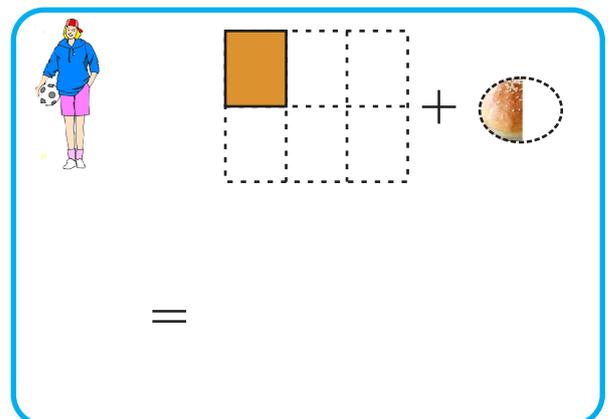
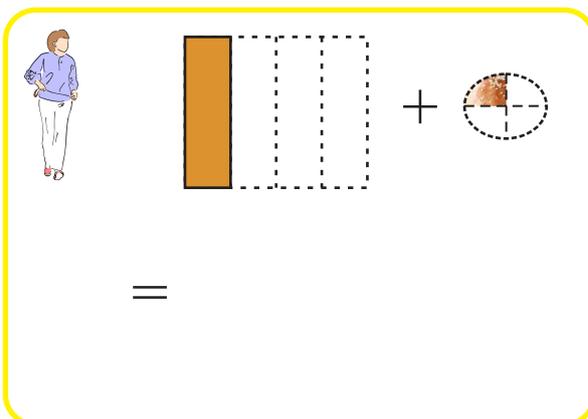
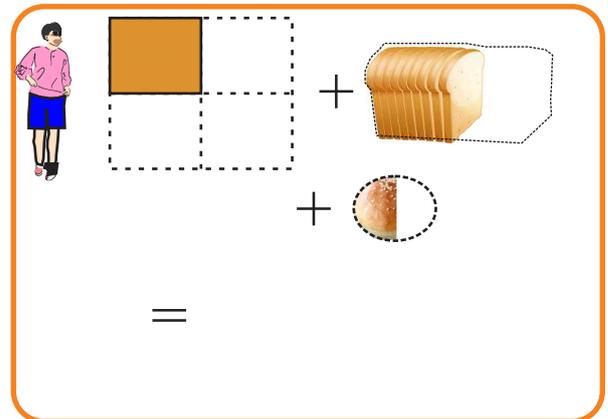
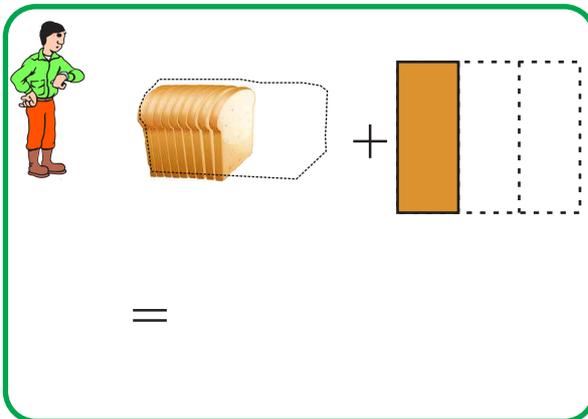
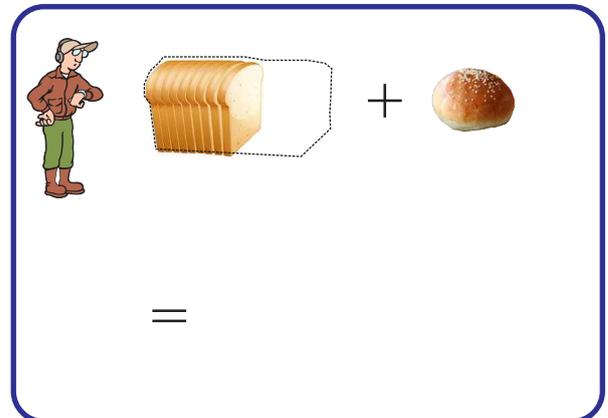
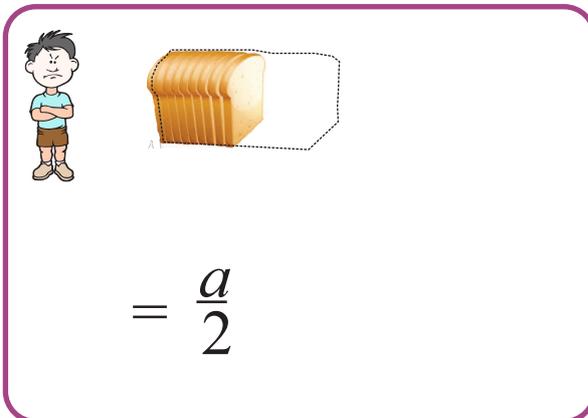
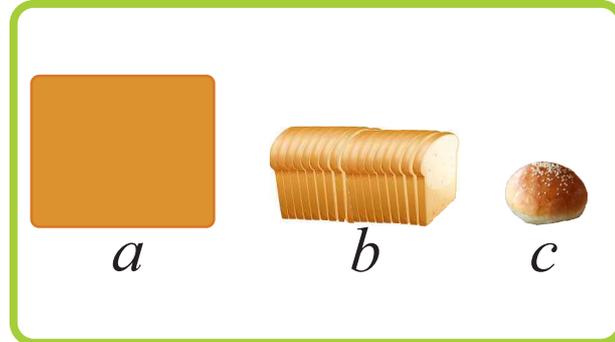
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## Activity Sheet

There are cakes with mass 'a', breads with mass 'b' and buns with mass 'c'. Find the total mass of food ate by each person



# 13 Mass

**Competency 9** : Uses the knowledge on mass to fulfill daily needs.

**Competency Level** : Manipulate masses given in terms of milligrams, grams and kilograms under the basic mathematical operations.

**Learning Outcomes :**

- Identifies the units used to measure mass.
- States the relationship between mg and g.
- Convert  $\text{mg} \leftrightarrow \text{g}$ .
- Estimates the mass of an object or an amount of a substance given.
- Add, subtract masses given in mg and g.
- Multiplies, divides by a whole number, the masses measured in mg and g.
- Multiplies, divides by a whole number, the masses measured in g and kg.
- Solves problems involve in masses.

## Idea to the teacher

Grams (g) and kilograms (kg) were introduced as standard units of measuring mass in grade 06 and this lesson introduces milligram (mg) as another unit of measuring mass by a traversal are discussed with the students.

## Learning Outcome

- Identifies the units used to measure mass.
- States the relationship between mg and g.
- Convert  $\text{mg} \leftrightarrow \text{g}$ .

Three activities related to these are given below

## Activity 01

## Quality Input

- Copies of the attachments 13.1 and 13.2
- Demai papers
- Glue/ pair of scissors

### Teachers' Role

- Make groups of 5 students.
- Provide the attachment 13.1 to each group.
- Provide demai papers scissors and glue for each group.
- Instruct the students to cut out the animal pictures in 13.1 and paste them in the demai paper according to ascending order of their masses.
- Provide the attachment 13.2 to each group.
- Let the students to estimate the mass of each animal and paste the relevant masses in front of each animal.
- Let each student to display their work to the class.
- Discuss the importance of measuring mass and using correct units to measure mass.
- Since the unit mg is introducing for the first time, discuss about the items that are measured in milligrams.

### Students' Role

- Cut out the animal pictures in attachment 13.1.
- Estimate the mass of each animal and paste it in the demai paper according to the ascending order of their masses.
- Cut the masses given in attachment 13.2 and paste the relevant masses in front of each animal.
- Display your work to the class.

### Activity 02

### Quality Input

- Packs of cards prepared using the attachment 13. 3. ( one pack for each group)

### Teachers' Role

- Group the students.
- Explain the relationship between the units mg, g and kg. Provide the Packs of cards prepared using the attachment 13. 3 to each group and ask the students to select the cards which indicates the same mass.
- Engage the students to do the exercise 13.1 on page 3 and 4 of the text book

### Students' Role

- Select the cards which indicates the same mass from the pack of cards given to your group.
- Complete the exercise 13.1 of the text book.
- Display your creations to the other groups.at the end of the activity.

### Activity 03

#### Quality Input

- Packs of cards prepared using the attachment 13. 4. ( Tarsia Puzzle)

#### Teachers' Role

- Group the students. . Provide the Packs of cards prepared using the attachment 13. 4 to each group.
- Instruct the students to complete the tarisa puzzle by joining the equal masses which are written in the sides of each triangle.

#### Students' Role

- Complete the tarisa puzzle by joining the equal masses which are written in the sides of each triangle.

#### Learning Outcome

- Estimates the mass of an object or an amount of a substance given

An activity related to this is given below

### Activity 01

#### Quality Input

- 100 marbles with same size.
- Balance scale, small containers to put marbles

#### Teachers' Role

- Distribute the marbles among groups.
- Measure the mass of a marble and give that value to the students.
- Engage the students in the activity.

## Students' Role

- Write the names of your group members in the given table.
- Take some marbles from the container and estimate its mass.
- Measure and find the mass of the marbles that you have taken.
- Likewise complete the table by writing the estimated value and the actual value of the marbles that each student has taken.

Name of the student	Estimated value	Actual value

## Learning Outcome

- Add, subtract masses given in mg and g.

An activity related to this is given below

Refer the pages 81, 82, 83 of the teacher's guide.

## Activity 01

## Quality Input

- Copies of the task sheet in attachment 13.8
- Circles and pointers prepared according to the attachments 13.6 and 13.7

## Teachers' Role

- Provide the circles and pointers A and B prepared according to the attachments 13.6 and 13.7 to each group.
- Provide the task sheet 13.8.
- Engage the students to do the exercise 13.5 on page 5 of the text book.

## Students' Role

- Spin the Circles A and B given to you. Obtain the value in which the pointer indicates and complete the given table.

Value of the circle A	Value of the circle B	A + B	A - B

- Some marbles from the container and estimate its mass.
- Measure and find the mass of the marbles that you have taken.
- Likewise complete the table by writing the estimated value and the actual value of the marbles that each student has taken.

Name of the student	Estimated value	Actual value

## Learning Outcome

- Multiply, divide masses given in mg and g

An activity related to this is given below

### Activity 01

## Quality Input

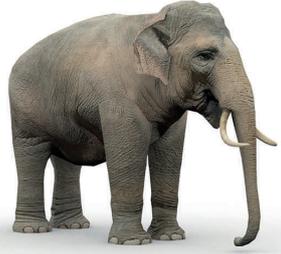
- Packs of cards prepared from the attachment 13.8

## Teachers' Role

- Provide the pack of cards for each group.
- Instruct the students to match the questions and answers in the cards and complete the domino chain.
- Engage the students to do the exercise 13.4 on pages 8 and 9 of the text book.

## Students' Role

- Match the questions and answers in the cards and complete the domino chain.

<p>Elephant</p> 	<p>mass</p>	<p>Rhinovirus</p> 	<p>mass</p>
<p>Bull</p> 	<p>mass</p>	<p>Elephant</p> 	<p>mass</p>
<p>Dog</p> 	<p>mass</p>	<p>Frog</p> 	<p>mass</p>
<p>Porcupine</p> 	<p>Elephant</p>	<p>Ruddy</p> 	<p>Elephant</p>
<p>Geco</p> 	<p>mass</p>	<p>Bee</p> 	<p>mass</p>
<p>Ant</p> 	<p>mass</p>	<p>Cock</p> 	<p>mass</p>

5000 kg

32 kg

2300 kg

3 kg

1100 kg

250 g

15 kg

60 g

5.5 kg

5 mg

100 mg

1.5 kg

2 g

2000 mg

5 g

1.5 kg

5000 mg

2000 g

7 kg

4250 g

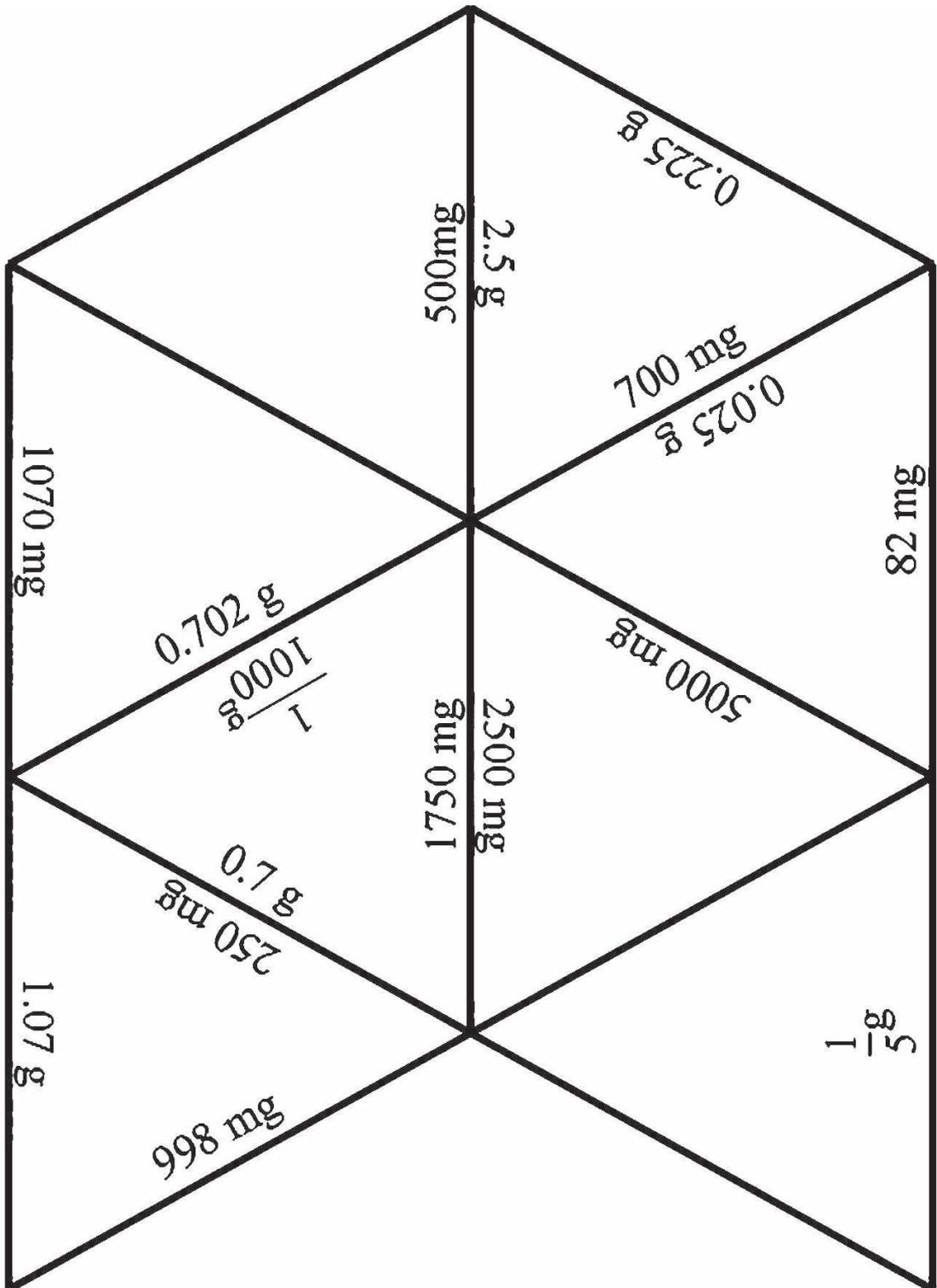
3000 mg

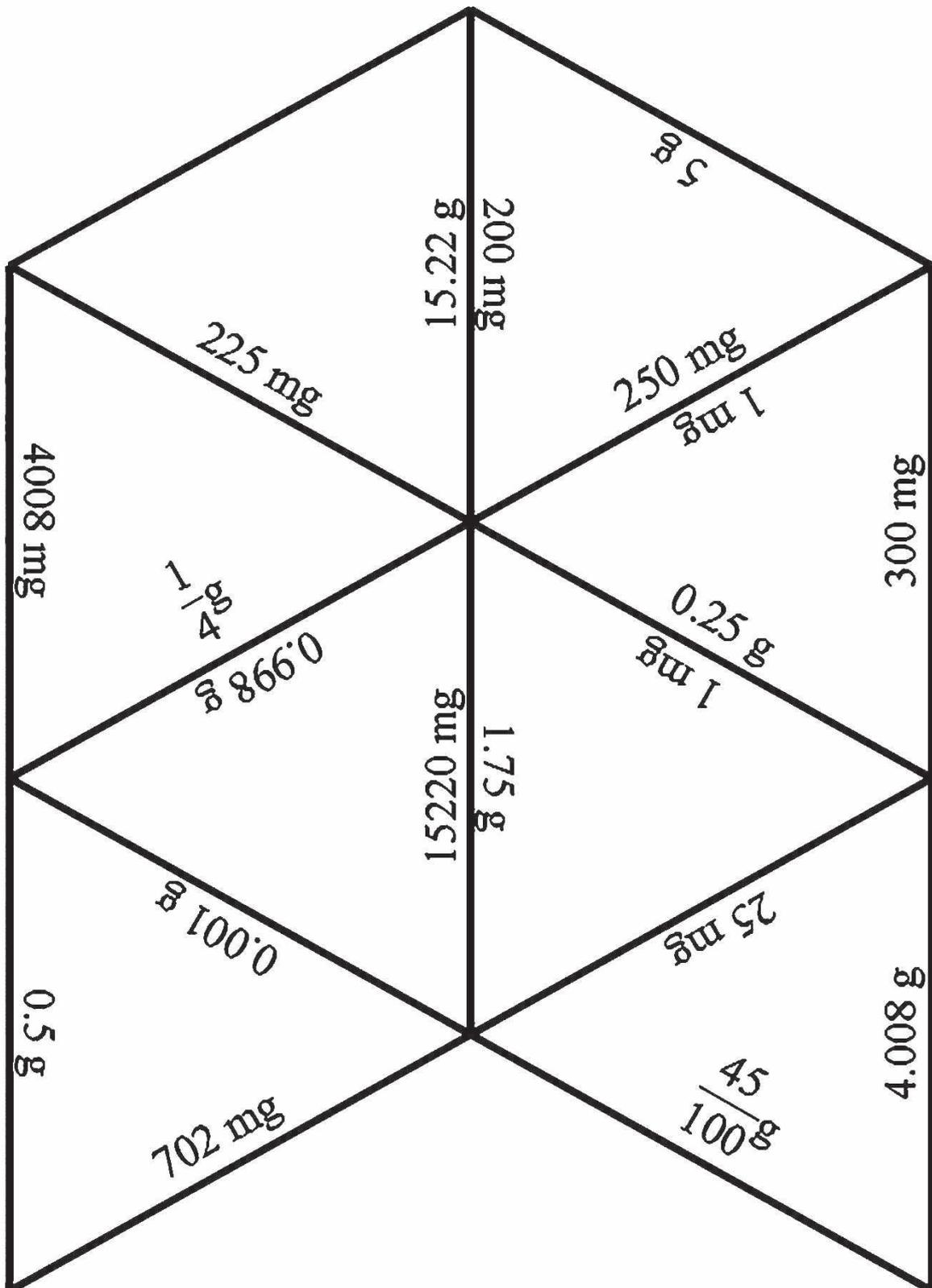
3750 mg

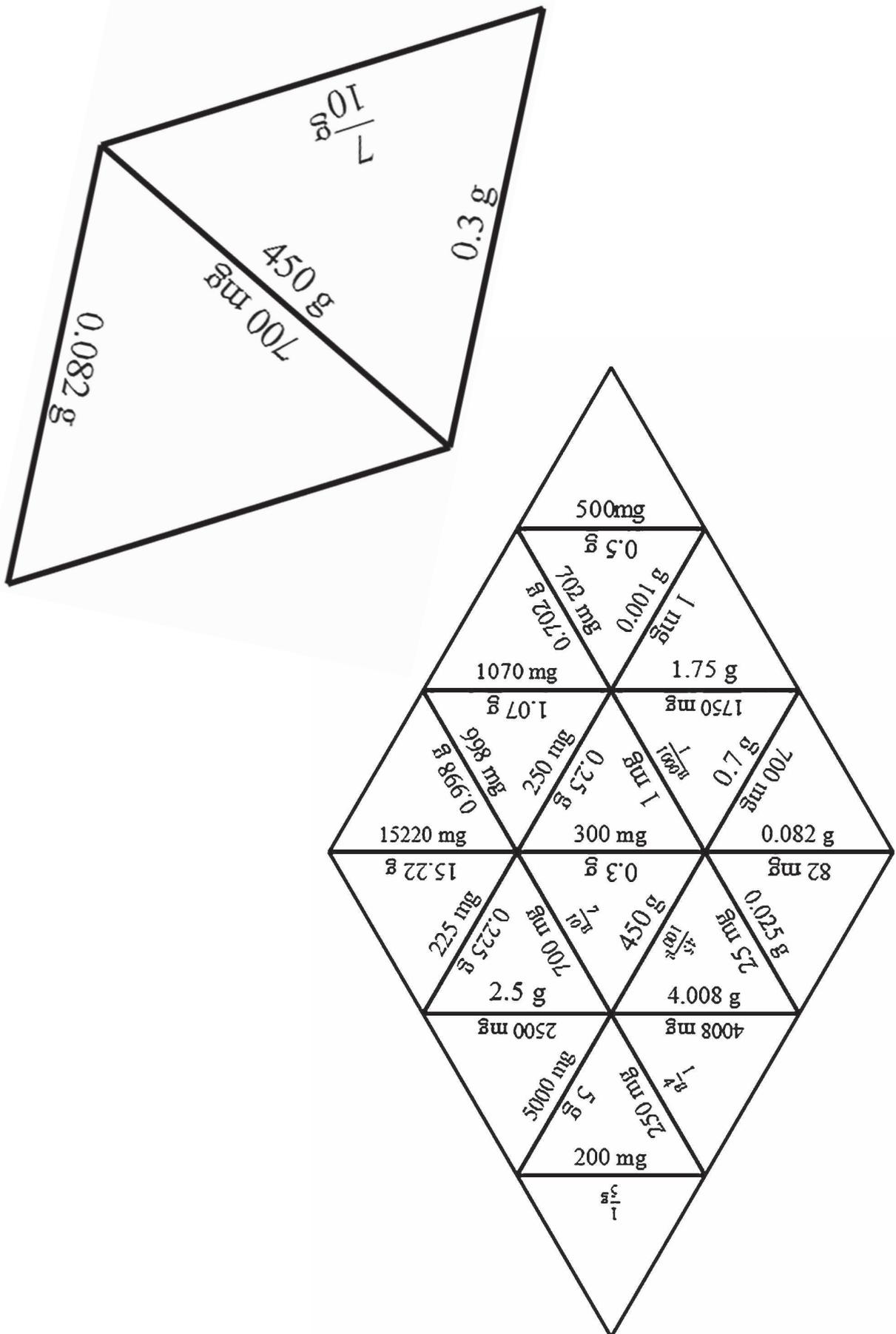
7000 g

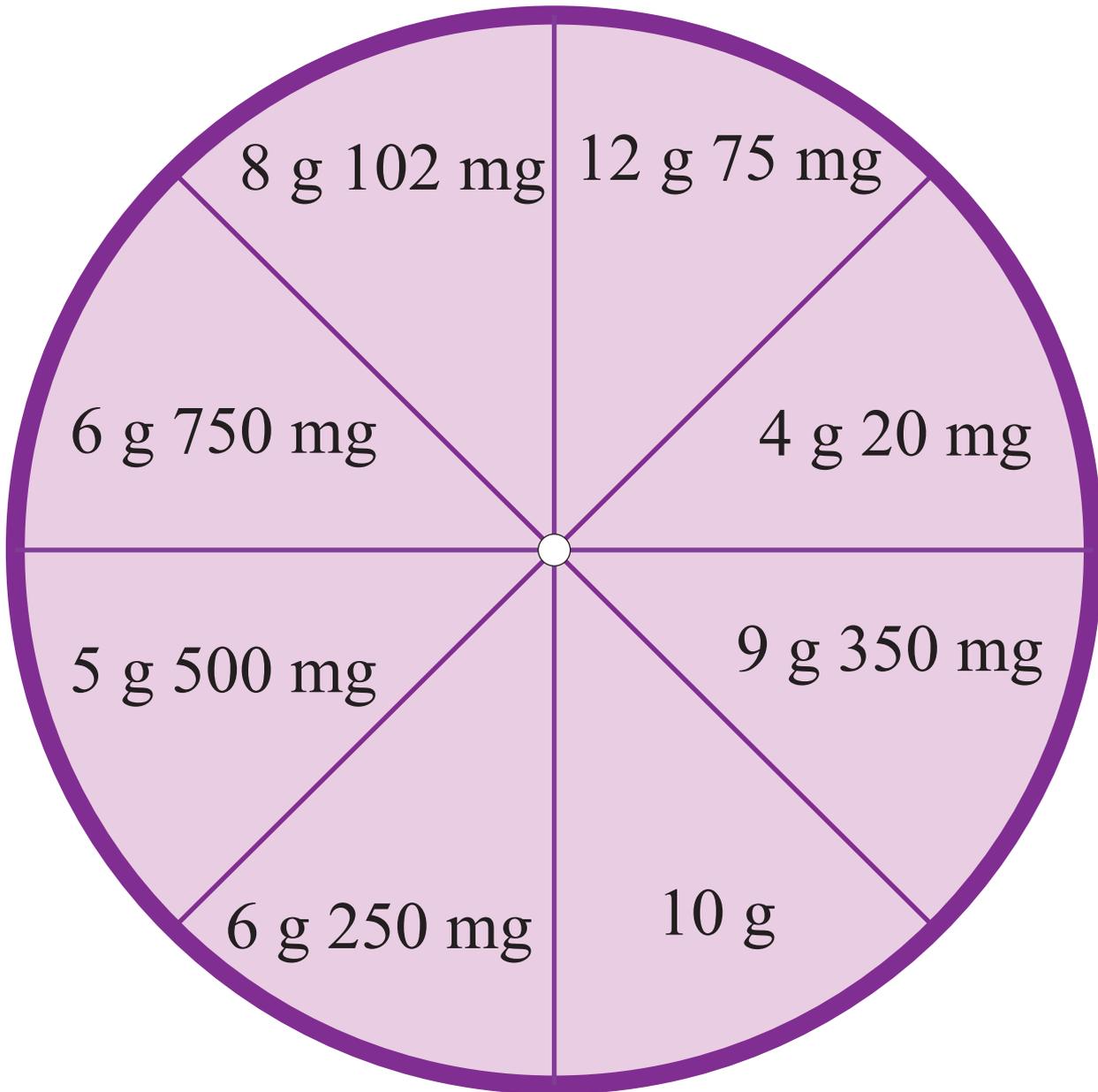
1000 mg

$1 \text{ g}$  $4 \text{ kg } 250 \text{ g}$  $2 \text{ kg}$  $4500 \text{ mg}$  $3 \text{ g } 750 \text{ mg}$  $2500 \text{ mg}$  $1500 \text{ mg}$  $2.5 \text{ g}$  $4 \text{ g } 500 \text{ mg}$  $\frac{3000}{1000} \text{ g}$  $\frac{1500}{1000} \text{ kg}$  $\frac{3}{2} \text{ g}$

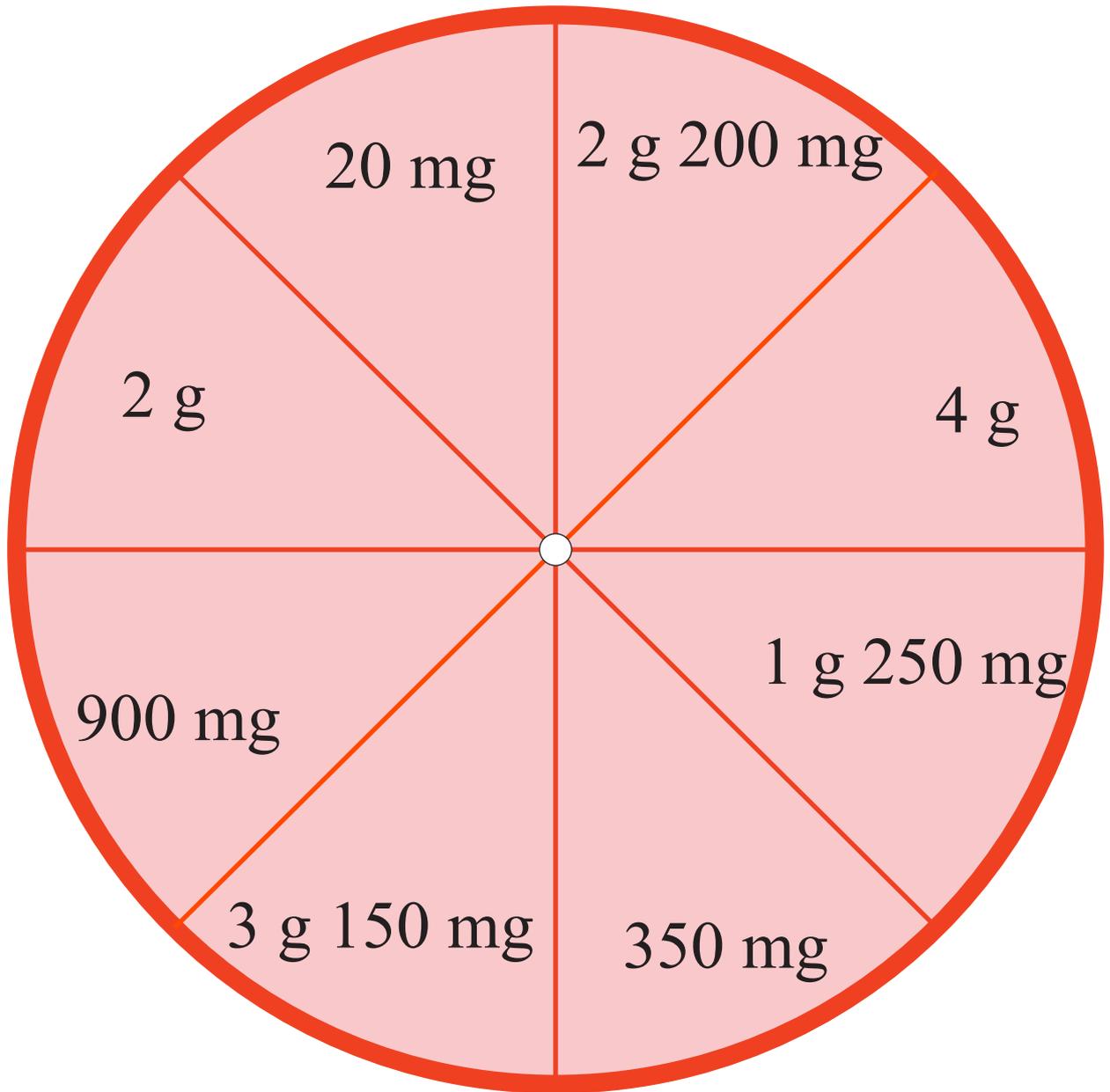








A



**B**

27 g 600 mg    5 g 200 mg  $\times$  3

15 g 600 mg    2 g 106 mg  $\times$  5

10 g 530 mg    12 g 320 mg  $\div$  8

1 g 540 mg    100 mg  $\times$  3

300 mg    2 g 500 mg  $\times$  4

10 g    3 g 100 mg  $\times$  9

27 g 900 mg    120 g  $\div$  5

24 g    3 g 250 mg  $\div$  2

1 g 625 mg    2 g 650 mg  $\times$  4

10 g 600 mg    2 g 300 mg  $\times$  12

12 kg 450 g	$3 \text{ kg } 750 \text{ g} \times 3$
-------------	--

11 kg 250 g	$2 \text{ kg } 105 \text{ g} \times 5$
-------------	--

10 kg 525 g	$15 \text{ kg } 750 \text{ g} \div 3$
-------------	---------------------------------------

5 kg 250 g	$4 \text{ kg } 355 \text{ g} \times 4$
------------	--

17 kg 420 g	$1 \text{ kg } 405 \text{ g} \times 6$
-------------	--

8 kg 430 g	$12 \text{ kg } 75 \text{ g} \div 3$
------------	--------------------------------------

4 kg 25 g	$5 \text{ kg } 125 \text{ g} \times 8$
-----------	--

41 kg	$7 \text{ kg } 375 \text{ g} \div 5$
-------	--------------------------------------

1 kg 475 g	$6 \text{ kg } 302 \text{ g} \times 4$
------------	--

25 kg 208 g	$4 \text{ kg } 150 \text{ g} \times 3$
-------------	--

## 14 Rectilinear Plane Figures

**Competency 23** : Makes decisions regarding day to day activities based on geometrical concepts related to rectilinear plane figures.

**Competency Level 23.1** : Classifies triangles based on various properties.

### Learning Outcomes

- Identifies the three angles and three sides as properties of a triangle.
- Identifies a triangle with all three angles acute, as an acute angled triangle.
- Identifies a triangle with a right angle, as a right angled triangle.
- Identifies a triangle with an obtuse angle, as an obtuse angled triangle.
- Identifies a triangle with three equal sides, as an equilateral triangle.
- Identifies a triangle with two equal sides, as an isosceles triangle.
- Identifies a triangle with three unequal sides, as a scalene triangle.
- Classifies triangles into 6 types by considering both their sides and their angles.

**Competency Level 23.2** : Classifies polygons according to their shapes.

### Learning outcomes

- Identifies a closed plane figure bounded by straight line segments as a polygon.
- Draws various polygons using a straight edge.
- Identifies a polygon with all the interior angles of magnitude less than  $180^\circ$  as convex polygons.
- Identifies polygons with at least one interior angle of magnitude greater than  $180^\circ$  as concave polygons.
- Identifies polygons with all sides equal and all interior angles equal as regular polygons. Engages in classifying polygons with reasons as convex, concave, regular or irregular polygons.
- Gives reasons as to why a concave polygon cannot be a regular polygon.

### Idea to the teacher

This lesson focuses on identifying a rectilinear plane figures and classifying them according to their properties. This can be considered as the initial step of constructing rectilinear plane figures and this lesson will discuss about exterior angles too.

### Learning Outcome

- Identifies a closed plane figure bounded by straight line segments as a polygon.  
Draws various polygons using a straight edge.

Three activities related to these are given below

### Activity 01

### Quality Input

- A Copy of the attachment 14.1 for each student.
- Straight edge

### Teachers' Role

- Make groups of 2 students and provide the attachment 14.1.
- Instruct them to complete the dichotomous key.
- Develop a discussion on rectilinear plane figures based on the properties of the figures obtained in part I.
- Focus your attention on the page 84 of grade 7 teacher's guide.
- Engage the students to do the exercise 14.1 on page 16 of the text book.

### Students' Role

- According to the instructions given in the attachment 14.1 engage in the activity and complete the task sheet.

### Learning Outcome

- Identifies a polygon with all the interior angles of magnitude less than  $180^{\circ}$  as convex polygons.
- Identifies polygons with at least one interior angle of magnitude greater than  $180^{\circ}$  as concave polygons.

Refer page numbers 57,58 in the grade 7 Teachers' Guide.

## Activity 01

### Quality Input

- Copies of the attachment 14.2 for each group

### Teachers' Role

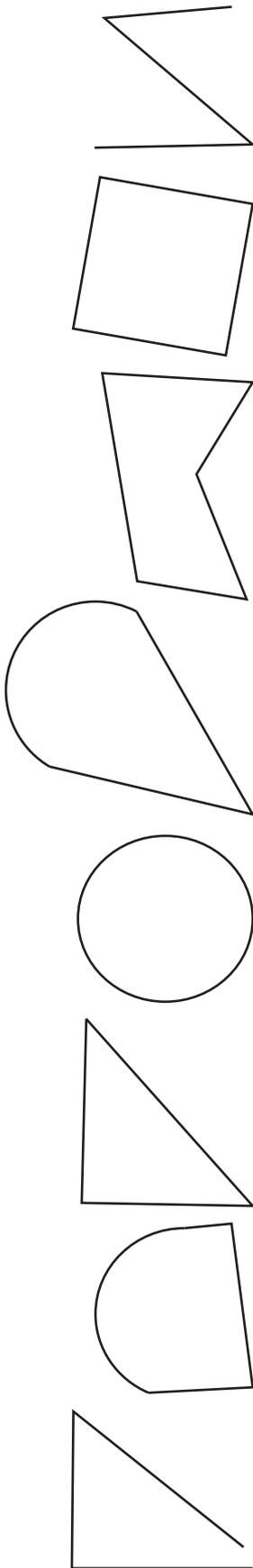
- Group the students and provide the attachment 14.2 for each group.
- Instruct them to do the activity according to the given instructions.
- Develop a discussion on convex and concave polygons based on the properties of the figures obtained in part I.
- Focus your attention on the page 84 of grade 7 teacher's guide.
- Engage the students to do the exercise 14.1 on page 16 of the text book.

### Students' Role

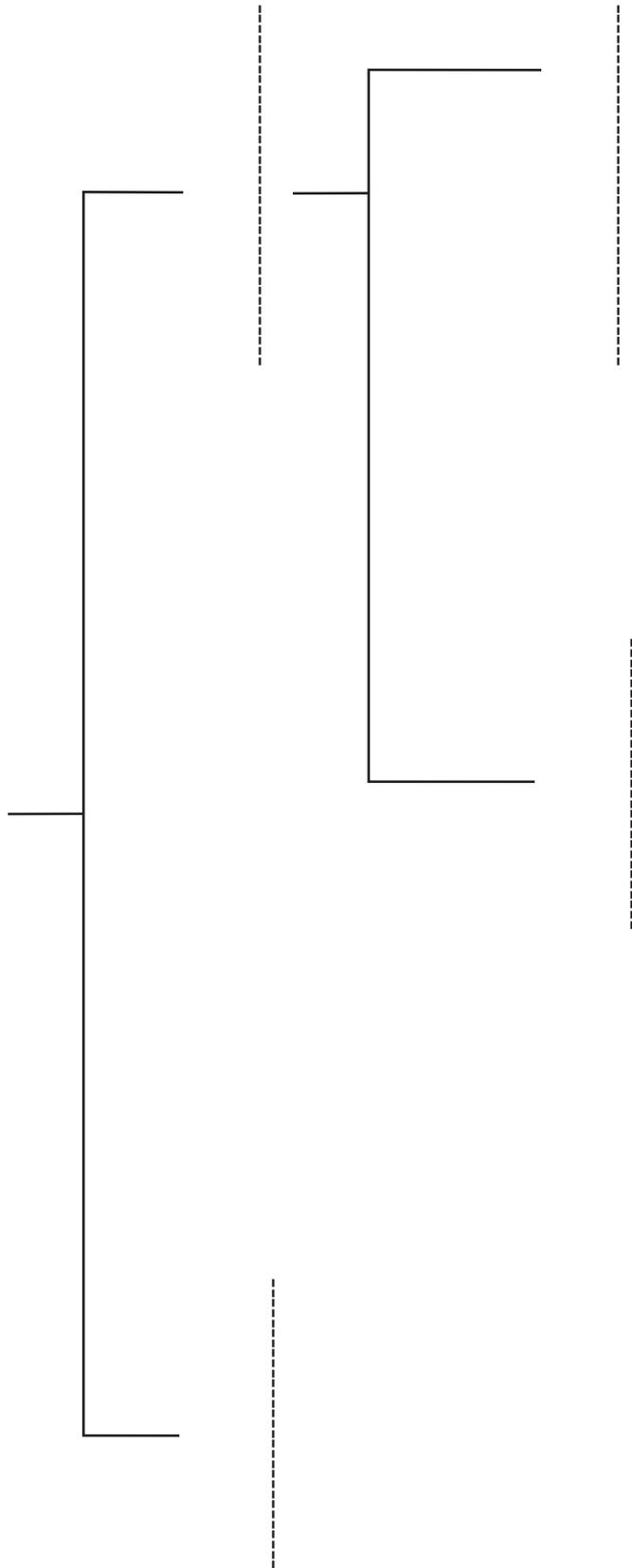
- According to the instructions given in the task sheet engage in the activity.
- Share your ideas with the class and participate for the discussion.

### Activity Sheet

Considering the way of grouping, separate these plane shapes according to characteristics. Write down the particular characteristics in given spaces

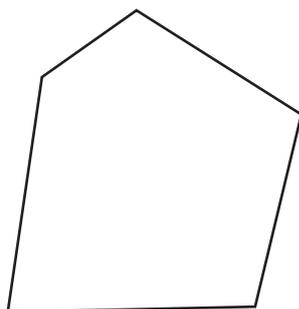
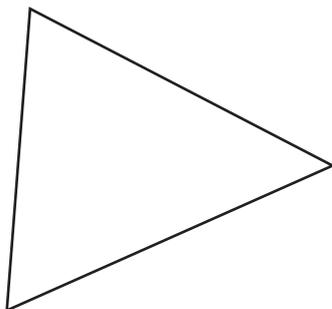
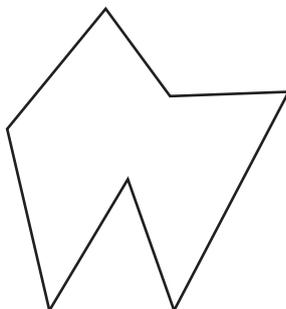
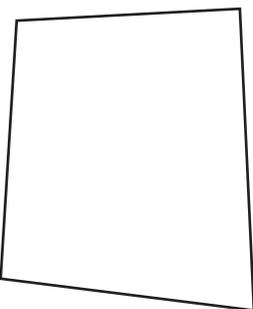
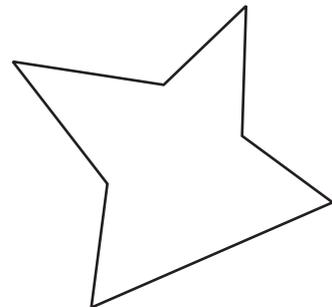
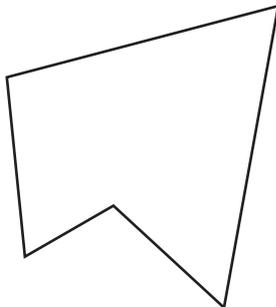
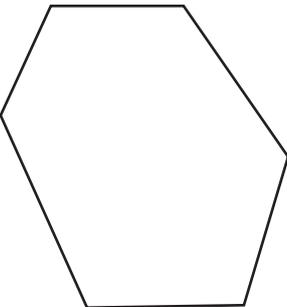
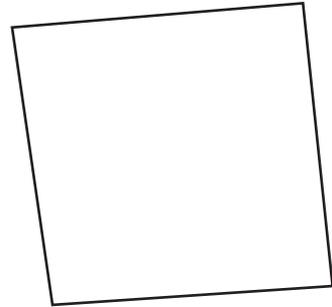
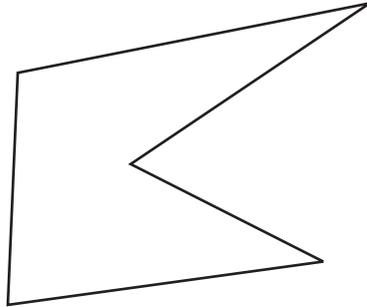
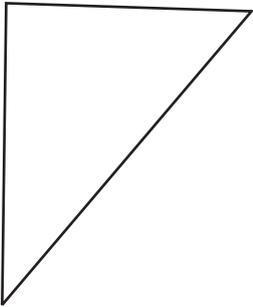


#### Plane Figures



### Activity Sheet

When connecting any two points which are inside the polygon. Some lines goes out of the polygon select them.



## 15 Equations and Formula

**Competency 17 :** Manipulates the methods of solving equations to fulfill the needs of day to day life

**Competency level 17.1:** Uses linear equations to solve problems encountered in daily life

**Learning Outcomes-**

- Based on the information that is given, constructs linear equations of the form  $x \pm a = b$ , where  $a, b \in \mathbb{N}$ , and  $a \neq 0$ .
- Based on the information that is given, constructs linear equations of the form  $ax = b$ , where  $a, b \in \mathbb{N}$ , and  $a \neq 0$ .
- Based on the information that is given, constructs linear equations of the form  $ax \pm b = c$ , where  $a, b, c \in \mathbb{N}$ , and  $a \neq 0$ .
- Using flow charts, solves equations with positive answers, of the form  $x \pm a = b$  where  $a, b \in \mathbb{N}$ , and  $a \neq 0$ .
- Using flow charts, solves equations with positive answers, of the form  $ax = b$ , where  $a, b \in \mathbb{N}$ , and  $a \neq 0$ .
- Using flow charts, solves equations with positive answers, of the form  $ax \pm b = c$  where  $a, b, c \in \mathbb{N}$ , and  $a \neq 0$ .

**Competency 19:** Explores the methods by which formulae can be applied to solve problems encountered in day to day life

**Competency level 19.1:** Easily solves problems encountered in daily life by constructing simple formulae

**Learning Outcomes-**

- Constructs a simple formula by considering the relationship between two variables.
- Constructs a simple formula by considering the relationship between three variables.
- Finds the value of a variable by substituting positive whole numbers for the other variables.
- Easily solves problems encountered in daily life by using the knowledge of formulae

### Idea to the teacher

Can discuss how construct simple equations regarding day-today activities.

Quotations are very important algebraically and it is essential to develop an equation as a life experience and solve it using algebraic methods. It is most suitable to introduce simple equations using pan balances.

## Learning Outcome

- Based on the information that is given, constructs linear equations of the like  $x \pm a = b$ , where  $a, b \in \mathbb{N}$ , and  $a \neq 0$ .
- Using flow charts, solves equations with positive answers, of the form  $x + a = b$ ,  $ax = b$  and  $ax \pm b = c$  where  $a, b, c \in \mathbb{N}$ ,  $a \neq 0$ .
- An activity related to these is given below

Refer page number 87 in the grade 7 Teachers' Guide

## Activity 01

### Quality Input

- Task sheet with annex 15.1, one for each student.

### Teachers' Role

- Discuss the three situations in page 27, in the text book part II with the students.
- Do the activity as pairs.
- Give task sheet with annex 15.1 for each students.
- Give instructions to fill in the cage given in front of the relevant steps using the knowledge about developing algebraic expression that is called as an equation.
- let the students to do the 15.1 exercise in the text book part II

### Students' Role

- Complete the task sheet according to the instruction of the teacher
- Do exercise in the page 28 in text book part II

## Learning Outcome

- solve an equation , using flow charts like  $x \pm \pm a = b$  where  $a, b \in \mathbb{N}$ ,  $a \neq 0$  so as to get a live number as the answer
- Solve an equation, using flow like  $ax = b$ , where  $a, b \in \mathbb{N}$ ,  $a \neq 0$  so as to get a live number as the answer
- solve an equation , using flow charts like  $ax \pm b = c$  where  $a, b, c \in \mathbb{N}$ ,  $a \neq 0$  so as to get a live number as the answer

An activity for these is given below

Refer page number 87 in the grade 7 Teachers' Guide

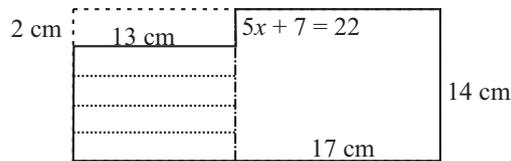
## Activity 01

### Quality Input

- Colour A4 sheets.
- Pair of scissors.

## Teachers' Role

- Divide students in to groups and give them quality inputs.
- Cut a A4 sheet length wise according to the measurements given in the diagram and advise them to write a flow chart

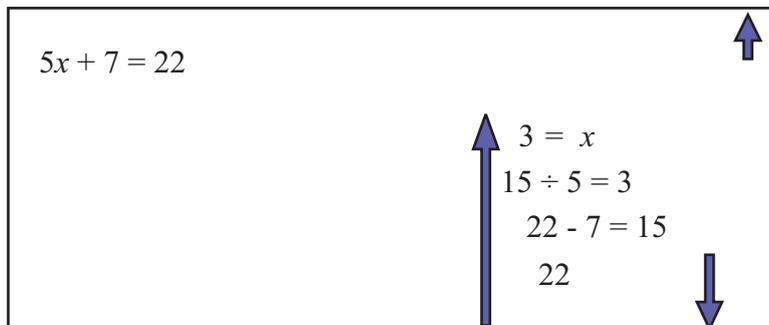


- Fold it in to tow parts throath the dotted line and remove a portion with 2cm 13cm
- Cut the remove portion in to fore equal parts like given diagram.
- Write the equation large portion and explain it and write the steps of developing an equation using the metical operation is exportation with 4 rows. Complete the flow charts and after completing the cart it is like this

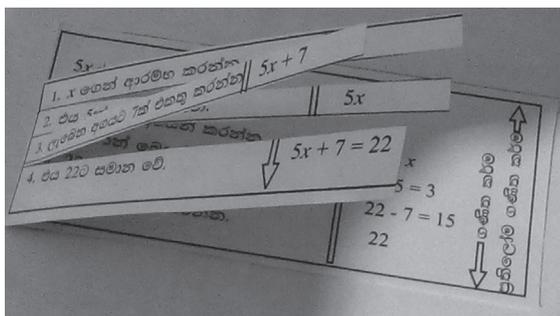
1. Start from x	x
2. Multiply it from 5	5x
3. Add 7 to the above value	5x+7
4. It is equals to 22	5x+7=22

## Teachers' Role

- Write the mathematical operations by writing the flow chart to develop the equation.
- Find the value of x by writing the reverse mathematical operations bottom to top
- After that complete the flow chart for each and every equation according to the one given below. find the value of x using that



- Demonstrate the model of the teacher where it's necessary.



- Give instructions to solve the equations page 33 in the exercise 15.2 in the text book part II

## Students' Role

- Design the papers of solving equations in colour sheets according to activity sheet 15.2 and teacher's instructions

## Learning Outcome

- Accept the use of Mathematical operations to solve simple equations.
- Solve equations using algebraic methods like  $x \pm a = b$ ,  $ax \pm b = c$  where  $a, b, c \in \mathbb{N}$ ,  $a \neq 0$  and to get positive integer as the solution.

Two activities related to these are given below

Refer page number 88 in the grade 7 Teachers' Guide

## Activity 01

### Quality Input

- Square shapes and rectangular shape lamina cut off from binding sheets with red and blue colour
- Task sheet with annex 15.3
- Four rectangular lamina and 10 red and blue colour square lamina for each group.

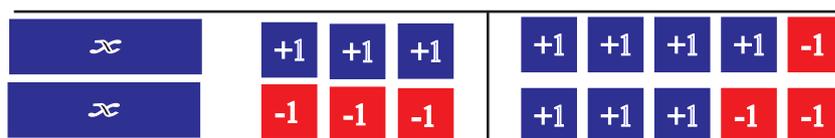
## Teachers' Role

- Cut rectangles with the size  $5\text{cm} \times 2\text{cm}$  from blue colour binding sheets
- Cut square with the size  $2\text{cm} \times 2\text{cm}$  from red colour binding sheets.
- Explain that it is considered rectangular lamina as  $x$ , blue colour square lamina as  $+1$  red colour square lamina as  $-1$
- Give activity sheet with annex 5.3
- Explain  $+1 + (-1) = 0$
- Pay your attention for the pages 87 and 88 in the teacher's instructional manual

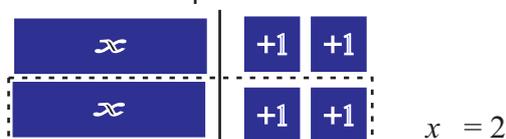
## Students' Role

- Look at this and identify how the equation  $2x+3=7$  is represented by using algebraic lamina.

$$2x+3=7$$



- $+1 + (-1) = 0$  Add red colour squares for both sides because  $(+1) + (-1) = 0$



- Do the activity with the annex 15.3 according to the method used to solve  $2x+3=7$

## Activity 02

### Quality Input

- Bristal board
- Copies of the annex 15.4

### Teachers' Role

- Print the tarsia puzzle in the annex 15.4 and paste in bristal boards and make card packs.
- Divide the students in to groups to have four students for each group give them card packs.
- Give instructions to complete the tarsia puzzle using the knowledge about solving equations.
- Inform that the group to arrange puzzle accurately with minimum time period is become the winning group

### Students' Role

- Complete the tarsia puzzle using the knowledge about solving equations.

### Learning Outcome

- Develop formula for a relationship between two variables.
- Develop formulas for the relationship among three variables.
- Find the value for the variables in a by substituting positive whole numbers.
- Solve problems in day -today life easily using the knowledge about formulas.

An activity is given below for this

Pay attention on page number 89in the grade 7 Teachers' Guide

## Activity 01

### Quality Input

- Task sheet with the annex 15.5 one for each group

### Teachers' Role

- Divide the students in to groups and give them task sheet with the annex 15.5.
- Give an opportunity for all groups to represent and to present the suggestions.
- Let the students to complete 15.3 & 15.4 exercises in the pages 34 and 35.

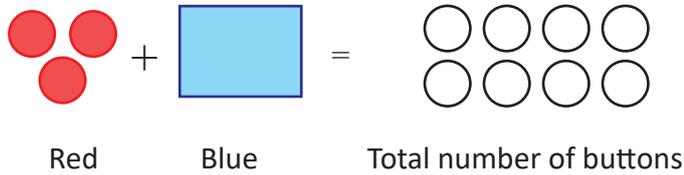
### Students' Role

- Complete the task sheet with the annex 15.5.

### Activity Sheet

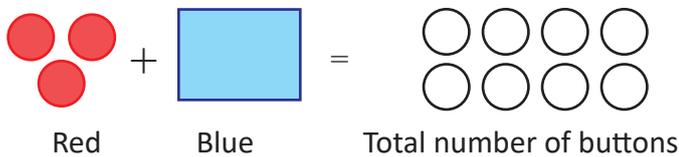
Do the activity given below using the provided buttons with different colours.

Add 3 red buttons to a certain number of blue buttons and then total numbers of buttons are 8



Develop a simple equation for the above statement, taking  $x$  as the number of blue button

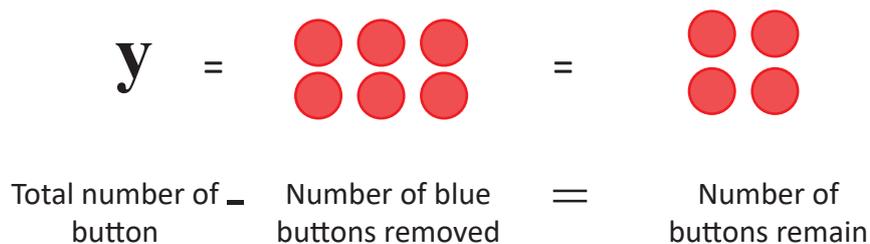
Answer sheet



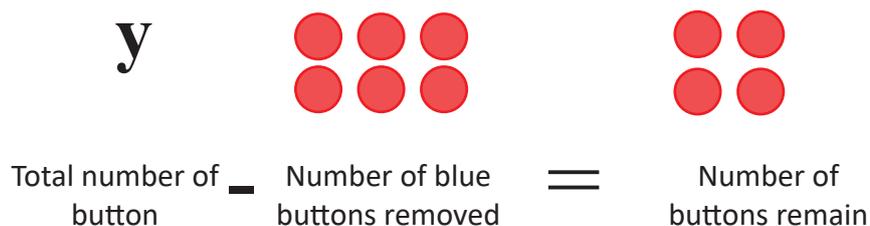
Number of red button + Number of blue button = Total Number of button

Add 3 red buttons to a certain number of blue buttons and then total numbers of buttons are 8

If 6 red buttons removed from  $y$  number of red buttons 4 buttons are remain represent this using a simple equation.



Answer sheet



When doing this activity consider  $x$  the number you thought

- Develop the algebraic expression step-by step
- Write the equation using that

- i) I imagined a number  
Add 7 to that number  
Answer is 12

$$\begin{array}{l} \square \\ \square \\ \square \end{array} = \square$$

- ii) I imagined a number  
Subtract 11 from that number  
Answer is 9

$$\begin{array}{l} \square \\ \square \\ \square \end{array} = \square$$

- iii) I imagined a number  
Multiply it by 4  
Answer is 32

$$\begin{array}{l} \square \\ \square \\ \square \end{array} = \square$$

- iv) I imagined a number  
Divide that number by 5  
Answer is 45

$$\begin{array}{l} \square \\ \square \\ \square \end{array} = \square$$

- v) I imagined a number  
Multiply that number by 5  
Subtract 2 from it  
Answer is 58

$$\begin{array}{l} \square \\ \square \\ \square \\ \square \end{array} = \square$$

- vi) I imagined a number  
Multiply that number by 3  
Add 5 from it  
Answer is 12

$$\begin{array}{l} \square \\ \square \\ \square \\ \square \end{array} = \square$$

### Activity Sheet

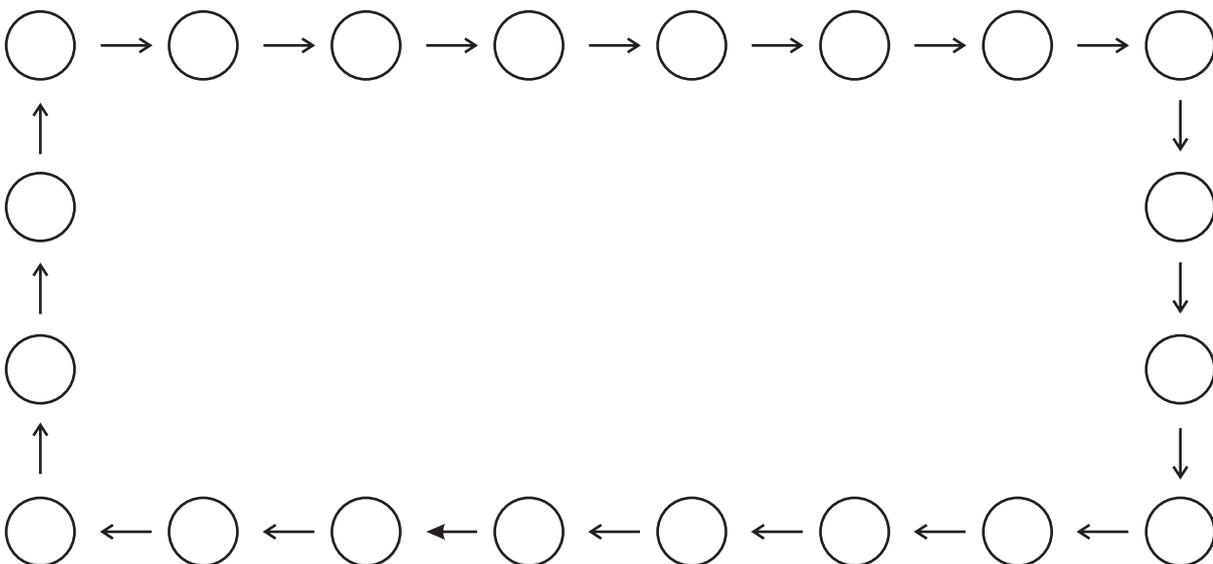
- Solve the equation  $3x+4=10$  using algebraic laminas
- Draw the relevant steps.
- Write the steps.

$3x + 4 = 10$	

- Present the steps you have used to solve, for the other groups.
- Solve  $5x+4=24$ , without using algebraic laminas

### Answer sheet

Annex 15.4.1



(30)

$$2x = 6$$

$$x = ?$$

(3)

$$x + 1 = 5$$

$$x = ?$$

(4)

$$3 + x = 4$$

$$x = ?$$

(1)

$$4x = 20$$

$$x = ?$$

(5)

$$x - 1 = 6$$

$$x = ?$$

(7)

$$15 - x = 5$$

$$x = ?$$

(10)

$$\frac{10}{x} = 5$$

$$x = ?$$

(2)

$$x - 6 = 0$$

$$x = ?$$

(6)

$$\frac{x}{3} = 5$$

$$x = ?$$

(15)

$$x - 6 = 10$$

$$x = ?$$

(16)

$$15 - x = 2$$

$$x = ?$$

(13)

$$\frac{40}{x} = 5$$

$$x = ?$$

(8)

$$\frac{x}{2} = 6$$

$$x = ?$$

(12)

$$x - 5 = 4$$

$$x = ?$$

(9)

$$3x = 33$$

$$x = ?$$

(11)

$$x + 7 = 7$$

$$x = ?$$

(0)

$$x - 4 = 10$$

$$x = ?$$

(14)

$$\frac{100}{x} = 4$$

$$x = ?$$

(25)

$$\frac{40}{x} = 2$$

$$x = ?$$

(20)

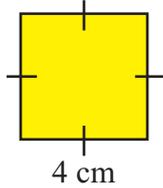
$$x + 20 = 50$$

$$x = ?$$

### Activity Sheet

Fill in the blanks and complete the activity sheet

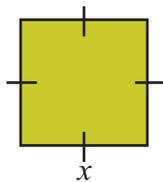
(1)



$$P = 4 \text{ cm} + 4 \text{ cm} + 4 \text{ cm} + \text{-----}$$

$$= 4 \times \text{----- cm}$$

$$P = \text{----- cm}$$

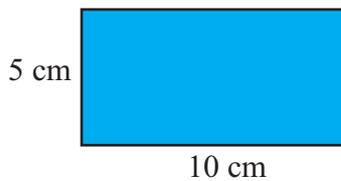


$$P = x \text{ cm} + \text{--- cm} + \text{---- cm} + x \text{ cm}$$

$$= 4 \times \text{----- cm}$$

----- = ---- cm
-----------------

(2)

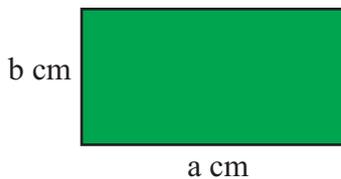


$$P = 10 \text{ cm} + \text{-- cm} + 5 \text{ cm} + \text{-----cm}$$

$$= 2(10 + \text{---}) \text{ cm}$$

$$P = 2 \times \text{----- cm}$$

$$P = \text{--- cm}$$

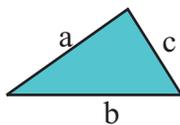


$$P = a \text{ cm} + \text{--- cm} + \text{---- cm} + b \text{ cm}$$

$$= 2(a + \text{-----}) \text{ cm}$$

----- = ---- cm
-----------------

(3)



If the perimeter of the triangular is  $P$ , express an equation using a band  $C$

(4) If the length is  $l$ , the width is  $b$  and the area of the rectangle is  $A$ , then relation between  $a$ ,  $l$  and  $b$  is  $A = lb$

Find the value of  $A$  if  $l = 8\text{cm}$  and  $b = 4\text{cm}$

## 16 Length

**Competency 7** : Investigates the various methods of finding the perimeter to carry out daily tasks effectively

**Competency level 7.1:** Manipulates measurements related to length under the basic mathematical operations to fulfill various needs

**Learning Outcomes-**

- Adds, subtracts lengths involving cm and mm.
- Adds, subtracts lengths involving m and cm.
- Adds, subtracts lengths involving km and m.
- Multiplies, divides by a whole number, the lengths involving cm and mm.
- Multiplies, divides by a whole number, the lengths involving m and cm.
- Multiplies, divides by a whole number, the lengths involving km and m.
- Solves problems related to measurements of length to fulfill various needs.

**Competency level 7.2:** Applies formulae to solve problems related to the perimeters

Of rectilinear plane figures

**Learning Outcomes-**

- Finds the perimeter of an equilateral triangle by using the formula
- Finds the perimeter of a square by using the formula.
- Finds the perimeter of a rectangle by using the formula.
- Finds the length of a side of an equilateral triangle, a square or a rectangle, when the perimeter is given.
- Applies formulae when solving problems involving perimeters.

### Idea to the teacher

Lead to do calculations connect with the practical events using mathematical operations and the knowledge about the concepts length, width and height and also it is important to confirm that perimeter is also a length.

## Learning Outcome

- Add and subtract measurements related to length with cm and mm

Two activities related to this given below for this.

## Activity 01

## Quality Input

- Straight edged with 30cm, one for each group glue bottles.

## Teachers' Role

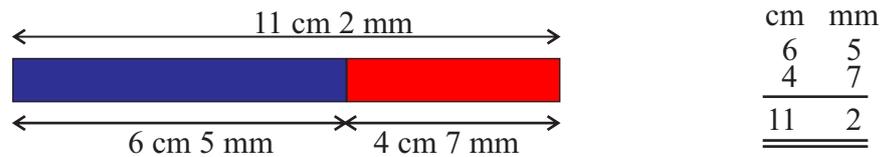
- Ask the students to do following things at home.
- Cut 5 strips with the width 2cm and different lengths less than 8cm using two different colours.(no need to mention the length & width)
- Prepare five strips pasting two strips with different colour.(you can use pasting allowances)



- Do the student activity using the strips prepared by the students
- Ask the students to paste a strip in their exercise book and measures the length of the each colour and write stand add them.
- Lead the students to compare the length abstain by adding and length obtains by measuring.
- Focus your attention to find out eras of measuring and calculating if the comparison of the students not accurate.
- Focus your attention for the pages 92 and 93 in the teachers instructions manual in grade 7

## Students' Role

- Do the activity using the 5 strips you made with two different colours according to teachers instructions.
- Paste one strip in your exercise book and measure the length of the each colour using a straight edge
- Write the measurements and find the total length of the strip.
- Now you can measure length of the whole strip and compare it with the length that you have calculated.
- Do this activity for all 5 strips.



E.g.

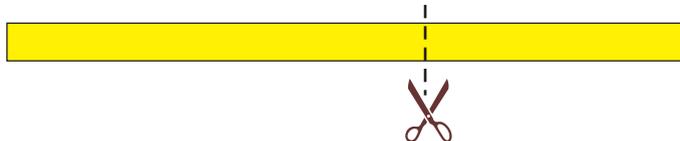
## Activity 02

### Quality Input

- Straight edge with 30cm, one for each group
- glue
- pair of scissors

### Teachers' Role

- Ask the student to cut five strips with the length less than 20cm and width 2cm using cardboard or A4 paper, day before the activity.
- Let them to measure the length of the strip and write it in the excise book then ask the student to cut the strip in to two unequal parts

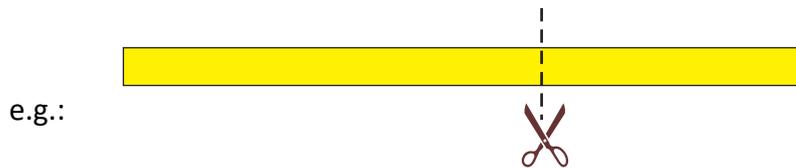


e.g.:

- Lead the students to measure the length of one part of the other part.
- Ask the students to measure the length of the remaining parts and compare it with the value obtained by calculating
- Let them to paste both parts in the exercise book.
- Do this activity for all five strips.

## Students' Role

- Measure the length of one strip using a straight edge and write in the book
- Divide the strip in to two parts by cutting it like the diagram given bellow.



- Measure and write the length of one part in the book, and calculate the length of the other parts
- Measure the length of the reaming part and compare it with the calculate value
- Paste both parts in the exercise book

## Learning Outcome

- Add and subtract measurements related to length with m and cm
- Adds, subtracts lengths involving km and m

Two activities related to this are given for this

## Activity 01

## Quality Input

- Bristol board
- Two boxes named as A and B

## Teachers' Role

- Prepare cards in the annex 16.1 using bristle boards and put them in to the boxes named as A and B
- Divide the students in to groups and give them a set of cards and ask to match cards in the box A and B

## Students' Role

- Select the cards in the box a and match them with the cards in the box B

## Activity 02

### Quality Input

- A4 papers
- Bristol board
- glue
- Two containers

### Teachers' Role

- Cut the cards in the annex 16.2 and put in to the containers named as A and B
- Give a set of cards for each group and them to select the answers in the B for the questions in the container B
- Lead the students to solve problems in question No 1(iii),(vii),4 in the page 42 exercise 16.2 in the text book part II

### Students' Role

- Select the question in the cards in container B for the questions in the cards in container A

### Learning Outcome

- Multiplies, divides by a whole number, the lengths involving cm and m  
An activity related to this is given for this

## Activity 01

### Quality Input

- Bristol boards
- Pair of scissors

### Teachers' Role

- Draw the diagram given in the annex 16.3 in a cardboard.
- Cut the octagon and semi circular parts separately
- Ask the students to complete the puzzle by matching the answer in semi circular parts for the questions in the triangular shape, regarding multiplication

### Students' Role

- Construct a shape by matching the questions and their answers, in the cards provide to you.

## Learning Outcome

- Multiplies, divides by a whole number, the lengths involving km and m.

Two activities related to this is given below.

### Activity 01

## Quality Input

- Bristol boards

## Teachers' Role

- Give the cards prepared solve the pazzal (annex 16.4) for the students the way you like.
- Lead the students to solve question number 1,(i), (ii),3,5 in the page 44, exercise 16.3 and question number 1, 2 (i),(ii) in the page 47, 16.4 exercise in the text book

## Students' Role

- Arrange the Domino chain

### Activity 02

## Quality Input

- Bristol boards

## Teachers' Role

- Cut the cards separately, which are and put them in to a container
- Give one answer sheet for each student.
- Divide students in to groups such that two or three members for group and give instructions for them to do the game.

### Students' Role

- Select any card from the container
- Write the measurement given inside the cage in any circle in the answer sheet.
- Do the multiplication given in the card and write the solution in the answer sheet according to arrow in the next circle.
- Then select the card with the answer inside the given cage
- Do the multiplication and write the solution in the next circle in the answer sheet .
- Do this for all 10 cards.
- The answer wrote inside the circle at the beginning should be equal to the

### Activity 012

#### Quality Input

- Bristol boards

#### Teachers' Role

- Divide the students in to groups and give the cards similar annex 16.1, one for each group
- Lead the students to solve problems in the question no 1, (iii),(iv), 2,4, 6, in the page 44,exercise 16.3 and question no 2(iii),(iv) 3,4,5,6, in the page 47, exercise 16.4 in the text book

### Students' Role

- Select the answers in the square shaped cards for the questions regarding division and make pairs using them.

#### Learning Outcome

- Multiply and divide measurements with 'km' and 'm' related to length by a whole number

An activity related to this is given below

### Activity 01

#### Quality Input

- Bristol boards

### Teachers' Role

- Draw the figure in the annex 16.5 in a cardboard cut and separate triangular parts.
- Let the students to complete question no 1, (v), (vi) in the page 44, exercise 16.3 in the text book.

### Students' Role

- Create a shape by matching the questions and the relevant answers in the cards provided to you.

### Learning Outcome

- Solves problems related to measurements of length to fulfill various needs

An activity related to this is given below

### Activity 01

### Quality Input

- A4 papers
- Meter ruler
- Straight edges

### Teachers' Role

- Divide the students in to groups and give meter ruler and straight edge,for each group
- Give instructions for the students to complete the table in the annex 16.6
- Instruct students to complete 16.5 exercise as a home work

### Students' Role

- Complete the table, using the measurement taken from the meter ruler from all the students in your group.

## A Box

$$\begin{array}{r} 4 \text{ m } 10 \text{ cm} \\ + 6 \text{ m } 2 \text{ cm} \end{array}$$
$$\begin{array}{r} 10 \text{ m } 8 \text{ cm} \\ + 2 \text{ m } 12 \text{ cm} \end{array}$$
$$\begin{array}{r} 2 \text{ m } 25 \text{ cm} \\ + 3 \text{ m } 70 \text{ cm} \end{array}$$
$$\begin{array}{r} 4 \text{ m } 35 \text{ cm} \\ + 3 \text{ m } 40 \text{ cm} \end{array}$$
$$\begin{array}{r} 3 \text{ m } 40 \text{ cm} \\ + 5 \text{ m } 65 \text{ cm} \end{array}$$
$$\begin{array}{r} 3 \text{ m } 75 \text{ cm} \\ + 8 \text{ m } 85 \text{ cm} \end{array}$$
$$\begin{array}{r} 9 \text{ m } 20 \text{ cm} \\ + 2 \text{ m } 80 \text{ cm} \end{array}$$
$$\begin{array}{r} 7 \text{ m } 73 \text{ cm} \\ + 2 \text{ m } 84 \text{ cm} \end{array}$$

## B Box

12 m 0 cm

12 m 20 cm

7 m 75 cm

9 m 05 cm

5 m 95 cm

12 m 60 cm

10 m 12 cm

10 m 57 cm

## A

(i) m cm 5 25 -3 15 <u>          </u> <u>          </u>	(ii) m cm 7 80 -3 35 <u>          </u> <u>          </u>	(iii) m cm 9 73 -3 57 <u>          </u> <u>          </u>	(iv) m cm 3 41 -2 34 <u>          </u> <u>          </u>
(v) m cm 8 45 -6 53 <u>          </u> <u>          </u>	(vi) m cm 3 75 -1 36 <u>          </u> <u>          </u>	(vii) m cm 10 53 -8 62 <u>          </u> <u>          </u>	(viii) m cm 12 75 -5 86 <u>          </u> <u>          </u>
(ix) m cm 7 52 -3 85 <u>          </u> <u>          </u>	(x) m cm 8 00 -7 34 <u>          </u> <u>          </u>	(xi) m cm 12 00 -10 75 <u>          </u> <u>          </u>	(xii) m cm 9 0 -7 6 <u>          </u> <u>          </u>

## B

2 m 10 cm	4 m 45 cm	6 m 16 cm	1 m 7 cm
1 m 92 cm	2 m 39 cm	1 m 91 cm	6 m 89 cm
3 m 67 cm	66 cm	1 m 25 cm	1 m 4 cm

The diagram consists of seven green triangular segments arranged in a circle, each containing a math problem. Surrounding these are seven orange semi-circular segments, each containing a measurement. The math problems are as follows:

- Top segment:** 
$$\begin{array}{r} \text{cm mm} \\ \times \\ 5 \\ \hline 2 \end{array}$$
- Top-right segment:** 
$$\begin{array}{r} \text{cm mm} \\ + \\ 10 \\ \hline 8 \end{array}$$
- Right segment:** 
$$\begin{array}{r} \text{cm mm} \\ \times \\ 3 \\ \hline 8 \\ 6 \end{array}$$
- Bottom-right segment:** 
$$\begin{array}{r} \text{cm mm} \\ + \\ 2 \\ \hline 4 \\ 5 \end{array}$$
- Bottom segment:** 
$$\begin{array}{r} \text{cm mm} \\ \times \\ 5 \\ \hline 3 \\ 3 \end{array}$$
- Bottom-left segment:** 
$$\begin{array}{r} \text{cm mm} \\ + \\ 3 \\ \hline 2 \\ 4 \end{array}$$
- Left segment:** 
$$\begin{array}{r} \text{cm mm} \\ \times \\ 9 \\ \hline 3 \end{array}$$
- Top-left segment:** 
$$\begin{array}{r} \text{cm mm} \\ + \\ 8 \\ \hline 5 \end{array}$$

The measurements in the orange segments are:

- Top: 1 cm 0 mm
- Top-right: 87 cm 2 mm
- Right: 22 cm 8 mm
- Bottom-right: 12 cm 0 mm
- Bottom: 15 cm 9 mm
- Bottom-left: 12 cm 8 mm
- Left: 2 cm 7 mm
- Top-left: 4 cm 0 mm

26 m 46 cm

$$\begin{array}{r} \text{m} \quad \text{cm} \\ 26 \quad 46 \\ \times \quad 6 \\ \hline \hline \end{array}$$

72 cm

$$\begin{array}{r} \text{m} \quad \text{cm} \\ 0 \quad 72 \\ \times \quad 9 \\ \hline \hline \end{array}$$

63 cm

$$\begin{array}{r} \text{m} \quad \text{cm} \\ 0 \quad 63 \\ \times \quad 9 \\ \hline \hline \end{array}$$

1 m 8 cm

$$\begin{array}{r} \text{m} \quad \text{cm} \\ 1 \quad 08 \\ \times \quad 8 \\ \hline \hline \end{array}$$

1 m 60 cm

$$\begin{array}{r} \text{m} \quad \text{cm} \\ 1 \quad 60 \\ \times \quad 5 \\ \hline \hline \end{array}$$

1 m 75 cm

$$\begin{array}{r} \text{m} \quad \text{cm} \\ 1 \quad 75 \\ \times \quad 5 \\ \hline \hline \end{array}$$

15 m 75 cm

$$\begin{array}{r} \text{m} \quad \text{cm} \\ 15 \quad 75 \\ \times \quad 6 \\ \hline \hline \end{array}$$

13 m 20 cm

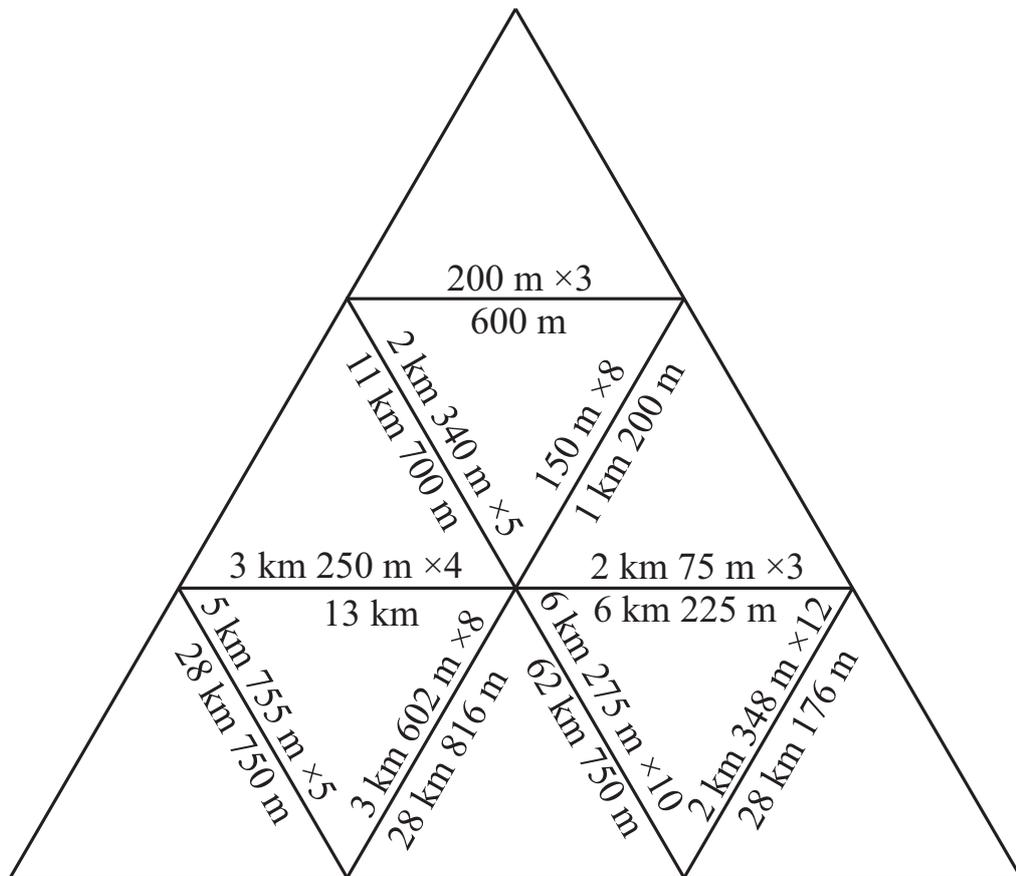
$$\begin{array}{r} \text{m} \quad \text{cm} \\ 13 \quad 20 \\ \times \quad 3 \\ \hline \hline \end{array}$$

10 m 35 cm

$$\begin{array}{r} \text{m} \quad \text{cm} \\ 10 \quad 35 \\ \times \quad 6 \\ \hline \hline \end{array}$$

29 m 10 cm

$$\begin{array}{r} \text{m} \quad \text{cm} \\ 29 \quad 10 \\ \times \quad 7 \\ \hline \hline \end{array}$$



### Activity Sheet

Selected Shape	Length	width	Parimeter
1 Teachers Table			
2 Cover of Maths Exercise book			
3 Cover of Maths Text book			
4 White board / Black board			

# 17 Area

**Competency 8:** Makes use of a limited space in an optimal manner by investigating the area.

**Competency Level 8.1:** Investigates the areas of rectilinear plane figures.

## Learning Outcomes-

- Identifies the standard units of area.
- Finds the area of a square using the formula.
- Finds the area of a rectangle using the formula.
- Finds the unknown dimension given the area and the length of a side of a rectangle.
- Estimates the area of a square.
- Estimates the area of a rectangle.
- Accepts that when finding the area of compound figures consisting of squares and rectangles, the figure should first be separated appropriately into squares and rectangles.
- Finds the area of compound plane figures consisting of squares and rectangles.
- Solves problems related to the area of compound plane figures consisting of squares and rectangles.

## Idea to the teacher

In grade 6, students have learned how to find the area of a square/Rectangle using a square net. But here it is concerned to find the area using formulae And also here it is studies to find the length and width if the area is given, and to find the area of a compound plane figure.

## Learning Outcome

- Identify the standard units used to measure area
- Find the area of a square using formulae
- Find the area of a rectangle using formulae

Two activities related to these are given below

Refer pages 95 and 98 in grade 7 Teacher's Guide

## Activity 01

## Quality Input

- One copy of the task sheet included in annex 17.1.1 for each group,
- A pair of scissors,
- Glue
- 1cm x 1cm square net
- Transparent sheet with the photocopy of the annex 17.1.2

### Teachers' Role

- Divide the students in to groups and provide necessary items.
- Give instructions to do the activity according to annex 17.1.1 given in the task sheet.
- Inspect the activity by helping the students were it's necessary
- Lead a discussion to develop a formula to find the area of a square according to presentations given by the groups
- Introduce 1cm x 1cm square net and how to find the length of a side of a square or rectangle drawn in that net, number of squares in a side length wisely, before the activity.

### Students' Role

- Do the Activity according to the annex 17.1.1 in the task sheet.
- Participate for the discussion according to presentations of the groups
- Do the activities in page 54 in the text book.

### Activity 02

#### Quality Input

- One task sheet with the annex 17.2.1 for each group
- A pair of scissors,
- Glue
- 1cm x 1cm square net
- Transparent sheet with the photocopy of the annex 17.2.2

### Teachers' Role

- Divide the student in to groups and provide necessary items.
- Give instructions for the to do the activity according to annex 17.2.1
- Lead a discussion to develop a formula to find the area of a rectangle according to presentations given by the groups
- Let the students to complete exercise 17.2 in the page 54 in the text book.

### Students' Role

- Estimate the area of square.
- Estimate the area of rectangle
- An activity is giving for this
- Focus your attention for the pages 95 and 96 in grade 7 teacher's instructional manual

### Learning Outcome

- Finds the area of a square using the formula.
- Finds the area of a rectangle using the formula.

An activity for these is given below

## Activity 01

### Quality Input

- Copy of the annex 17.4.1 for each group.

### Teachers' Role

- Divide the student in to groups and provide them the task sheet with annex 17.4.1
- Give instructions to find the area of the plane figures according to area of the shaded portion of it.
- Give instructions to complete the relevant column in the table after estimating
- Give the actual area of the each figure.
- Ask them to complete the table using that
- Decide the wining group by finding the group with least total difference and lead a discussion to estimate the area of square and rectangle

Figure	Area
A	120cm <sup>2</sup>
B	64cm <sup>2</sup>
C	75cm <sup>2</sup>

### Students' Role

- In the activity paper provided to you
- Find the area of the whole plane figure according to the shaded portion of it
- Complete the table given in the activity paper
- Calculate the total difference by mentioning the true area given to you from your teacher

### Learning Outcome

- Accept when finding the area of compound plane figures with squares and rectangles it is separated in to squares and rectangles accordingly
- Calculate the area of compound plane figures with square and rectangles.
- Solve problems and find the area related to compound plan figures with square and rectangles

An activity related to this is given below

Refer page 96 in grade 7 teacher instruction manual

## Activity 01

### Quality Input

- A demai paper with the activity paper given in annex 17.3.1
- Peit pens
- Straight edges

### Teachers' Role

- Divide the students in to groups and give the activity paper with annex17.3.1 and other accessories.
- Give instructions according to the sets given below, to find the area of the figures in the table, given in activity paper with annex 17.3.1
- Asks to separate the diagrams given in the first column in the table, in to square and rectangles
- Then give instruction to represent the diagrams with relevant measurement in the second column
- Find the area of the compound plan figures, calculation the area of square and rectangle
- Lead a discussion about finding the area of a compound plane figure according to presentations of the groups.
- Let the students to complete the 17.3 exercise in page 60&61 in grade 7 text book.

### Students' Role

- Do the activity according to the instructions given in the activity paper annex 17.3.1
- Give your suggestions and represent them doing a discussion with your teacher
- Do 17.3 exercise in page 60 & 61 in the grade 7 text book

### Activity paper

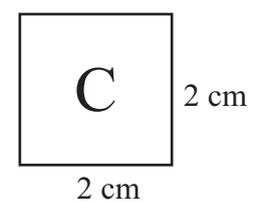
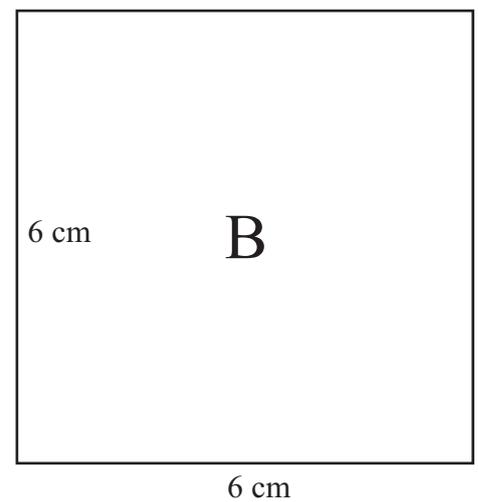
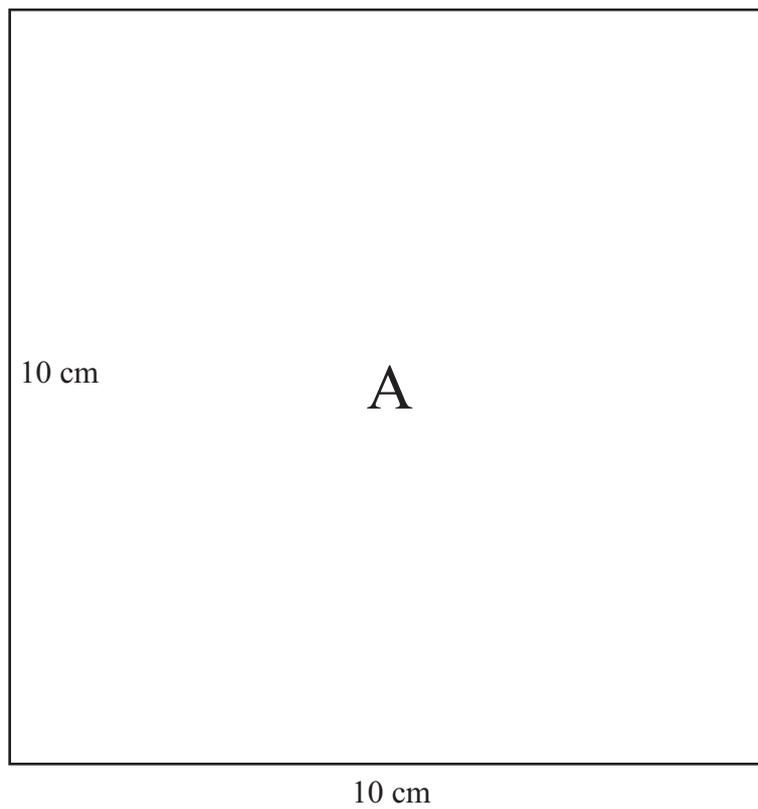
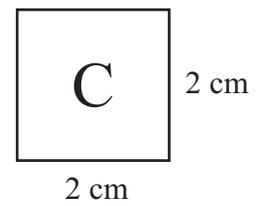
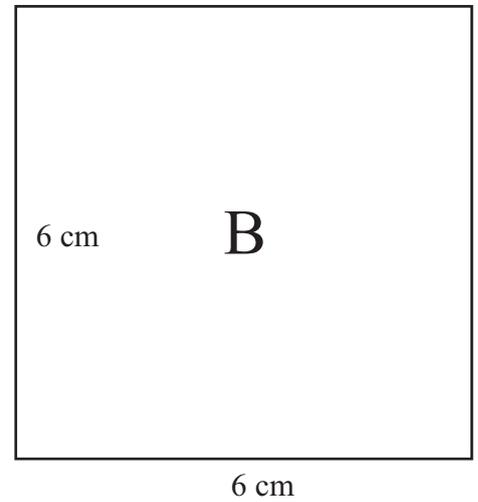
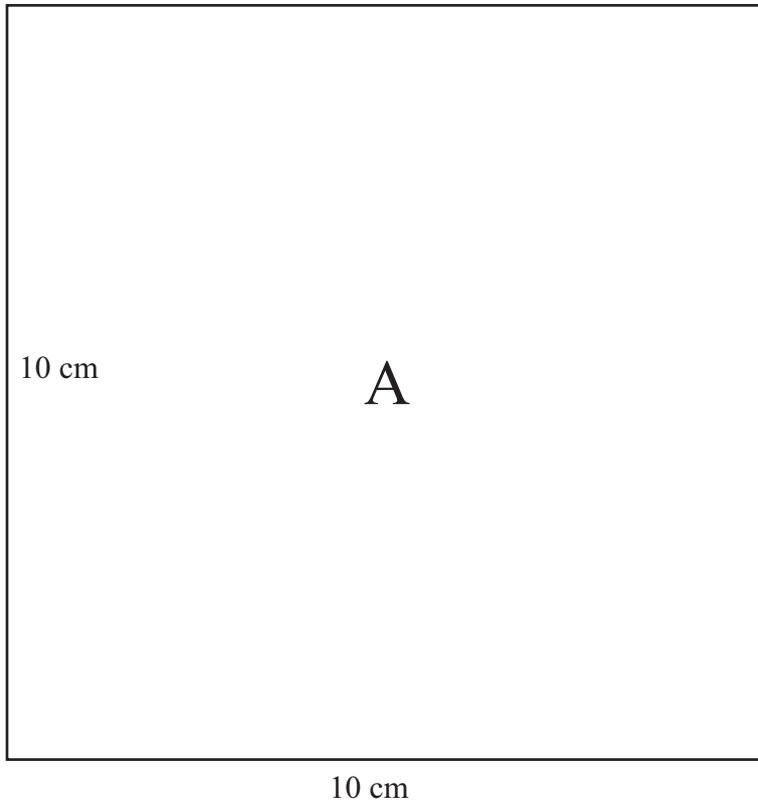
- Do the activity according to given instructions and complete the table
1. Cut and separate the diagrams in the transparent sheet.
  2. Paste them in 1cm x 1cm square ruled paper accurately. (when pasting this do not cover half of a square)
  3. Answer the questions while completing the table given below.

Figure	No. of squares covered from the shape	Area $\text{cm}^2$	Length according to No of squares in a row	Wide according of No: of squares in a Column	Length x width
A					
B					
C					

- I. Is there any relationship between area of the figure (Length x width) and value of write it
- II. Write an expression using "a" for the area of a square, where the length of side is 'a'

**Activity paper**

(Photocopy these using transparent sheets)



### Activity paper

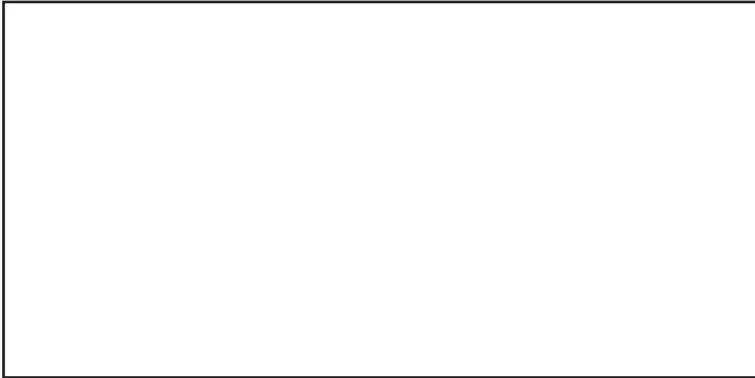
- Do the activity according to given instructions and complete the table
4. Cut and separate the diagrams in the transparent sheet.
  5. Paste them in a square ruled paper (don't leave half from a square when pasting)
  6. Answer the questions while completing the table given below.

Figure	No. of specific name of the figure	The length according to No: of squares in a row (cm)	Area $\text{cm}^2$	The wide according of No: of squares in a column	Length x width
(i).					
(ii).					
(iii).					

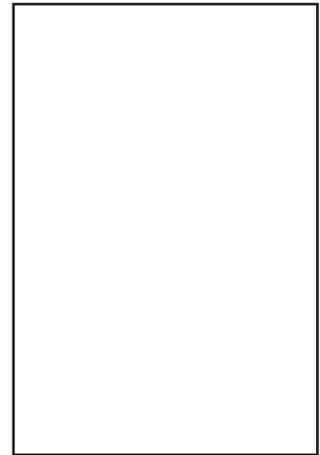
- i). Is there any relationship between the area of the figure and the value of length x width

**Activity paper**

(Photocopy these using transparent sheets)



(i)  $10\text{ cm} \times 5\text{ cm}$



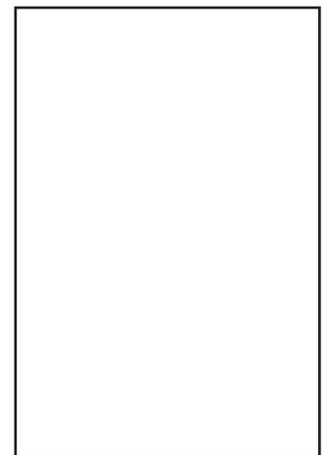
(ii)  $4\text{ cm} \times 6\text{ cm}$



(iii)  $12\text{ cm} \times 4\text{ cm}$



(i)  $10\text{ cm} \times 5\text{ cm}$

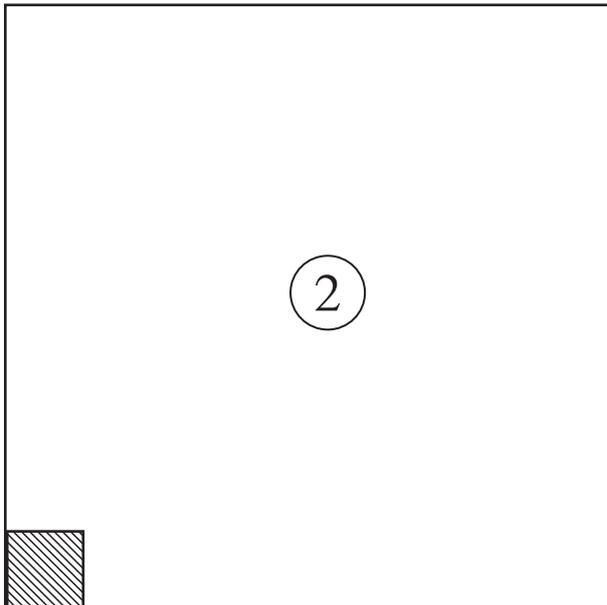
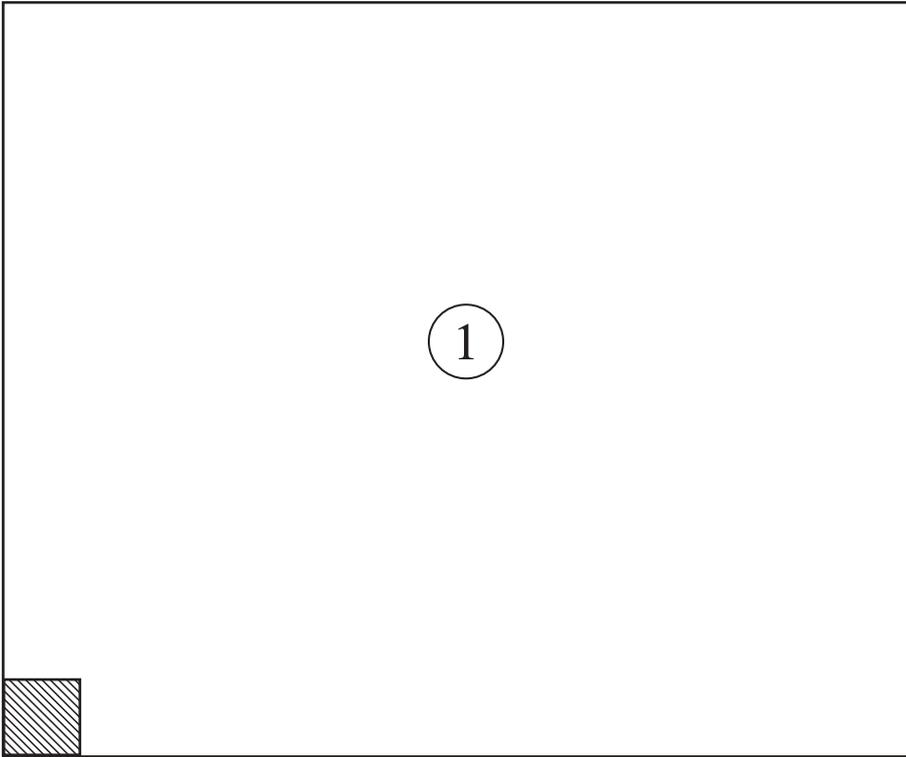


(ii)  $4\text{ cm} \times 6\text{ cm}$

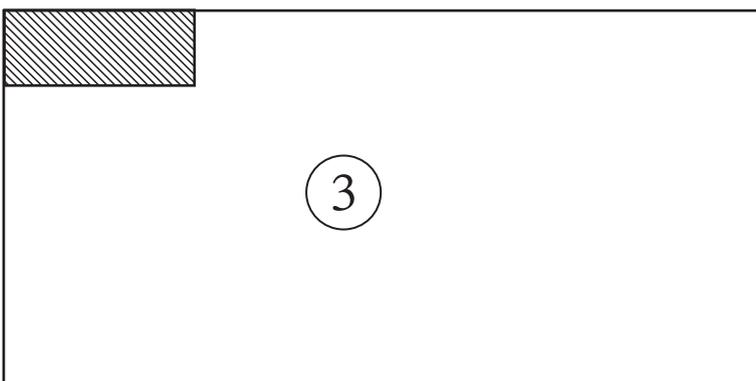


(iii)  $12\text{ cm} \times 4\text{ cm}$

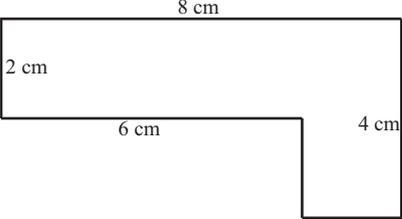
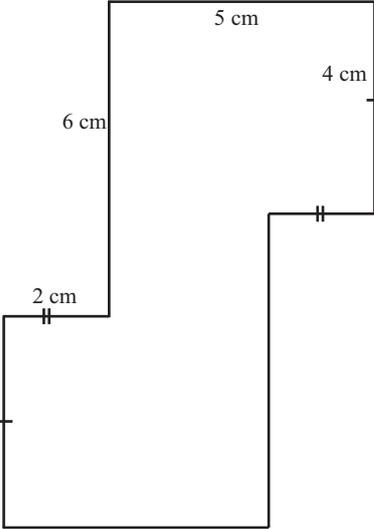
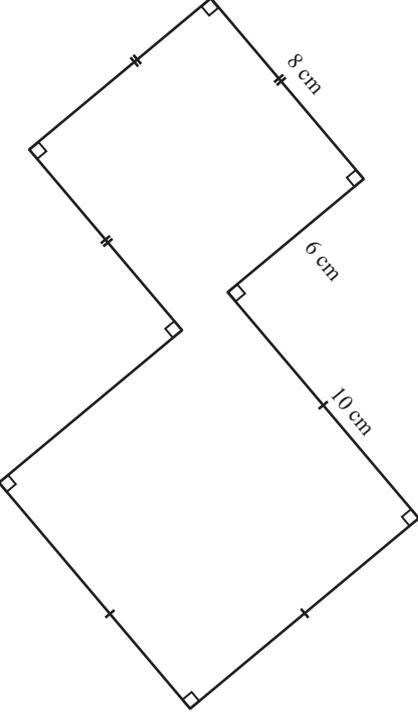
Find the area of this compound plane figures. Given in the table



1.		
2.		
3.		



Find the area of this compound plane figures. Given in the table

Compound plane figure	Rectangles and square separated from the sheet	Area of the parts	Area of the compound figure
			
			
			

## 18 Circles

**Competency 24:** Thinks logically to make decisions based on geometrical concepts related to circles.

**Competency level 24.1:** Creates designs using circles.

### Learning Outcomes-

- Draws circles by accurately manipulating a pair of compasses.
- Creates circular designs by using a pair of compasses.
- Investigates the different instruments that can be used to draw circles.
- For a given situation, identifies the instrument that is suitable to be used to draw a circle.
- Identifies the point right at the middle of a circle as its centre.
- Identifies a straight line segment which joins the centre to a point on the circle as the radius of the circle.

### Idea to the teacher

Students have obtained the capability of identifying a circle among various shapes. In this lesson introduce centre, radius, and diameter of the circle

### Learning Outcome

- Investigates the different instruments that can be used to draw circles.
- For a given situation, identifies the instrument that is suitable to be used to draw a circle.

Two activities related to these are given below

Refer page numbers 99 - 101 in the Grade 7 Teachers Guide

## Activity 01

### Quality Input

- Compass kit for the teacher demonstration
- Compass for students and ruler

### Teachers' Role

- Show how draw a correctly using compass on the black board.
- Induces center radios and diameter.
- Distribute the activity sheet 18 .1 among the group and let them to do the activity

### Students' Role

- Do the activity according to the subject content and instructions given in 18.1

## Activity 02

### Quality Input

- Activity sheet in annex 18.2 (one for each group)
- Compass and a ruler

### Teachers' Role

- Divide the students in to groups and direct the students to do activity in annex 18.2
- Direct the students to do excises 18.2 in page 69 and 70 in the text book

### Students' Role

- Complete the activity in annex 18.2

### Activity Sheet

Give the answers to the question using the diagram given below

I. Introduce the point O

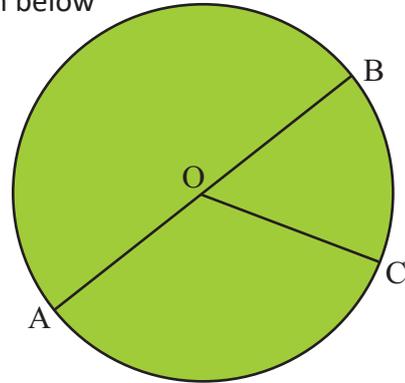
.....

II. Measure and write the length OA, OB and OC

OA = .....

OB = .....

OC = .....



III. What is the relationship between OA, OB and OC

.....

IV. What is the special name for line segments? OA, OB and OC

.....

V. Measure and write the length AB

.....

VI. What is the special name for line segments OA and AB.?

.....

VII. Fill the label given below using that relationship

Radius	Diameter
7 cm	14 cm
14 cm	-----
3.5 cm	-----
-----	42 cm
-----	21 cm

## Activity Sheet

Do the activity using the given sheets

- 1) Draw circles with following radius  
7 cm, 5 cm, 3.5 cm
- 2) Draw the largest circle that can be drawn in a A4 sheet and measure the radius of it.
- 3) Using circles draw a wall decoration or a decoration for a religious place

# 19 Volume

**Competency 10:** Gets the maximum out of space by working critically with respect to volume

**Competency level 10.1:** Inquiries into the amount of space taken up by cubes and Cuboids

## Learning Outcomes-

- Explains the concept of volume.
- Expresses the volume of a cube in terms of arbitrary units.
- Expresses the volume of a cuboid in terms of arbitrary units.
- Expresses the volume of a cube in terms of standard units.
- Expresses the volume of a cuboid in terms of standard units.
- For a given volume of a cuboid, mentions possible lengths, breadths and heights.
- Estimates the volume of a cube/cuboid.
- Identifies the relationships between the volumes of cubes, cuboids as well as between the volumes of cubes and cuboids

## Idea to the teacher

Learned the features of cube and cuboids and also about “net” in grade 6 . Here it is lead to a process of exploring by understanding the concept of volume and express the volume of cube and cuboids using arbitrary units

## Learning Outcome

- Explain the concept of volume.

An activity related to this is given below

## Activity 01

### Quality Input

- A Saucer
- A glass
- A dice sing in the water of other suitable object

### Teachers' Role

- Give instructive to the students, to put dice in to the glass of water on the saucer and he water level of the glass should be marked in to a certain height
- Discuss that the amount of space occupies by a solid object according to the amount of water goes up when observing the activity , is called as the volume.

### Students' Role

- Do the activity according to the instructions given by the teacher and express your observations.

### Learning Outcome

- Express the volume of a cube using arbitrator units.
- Express the volume of a cuboids using arbitrary units.

An activity related to this is given below

## Activity 01

### Quality Input

- 100 Center cubs

### Teachers' Role

- Divide the students in to groups and give 8 center cubes for each group.
- Ask them to make a cube using the small cubes provided to them.
- Tell them that they have got center cubes with the volume of 1 cube is equals to one cubic units. Then ask from each group what is the volume of the cube they have made.
- Lead the students to create a cuboids using the small cubes provided to them and ask from each group what is the volume of it students activities.

### Students' Role

- Make a cube using the small cubes provided to them and express the volume of it.
- Make a cuboids' using the small cubes provided to them and express the volume of it.
- Express the length , width and height of the cubes made.

### Learning Outcome

- Express the volume of a cube using arbitrary units.
- Express the volume of a cuboids' using arbitrary units.
- Express length , width and height of a cuboids' with exact volume.

An activity related to these is given below

### Activity 01

### Quality Input

- 100 center cubes.
- Task sheet in the page 104 in teacher's instructional manual

### Teachers' Role

- Divide the students in to groups and give the task sheet mention in the page 104 in Teacher's instructional manual , for each group.
- Give center cubes for each group such as 8,12,18,20,24,27
- Give instructions for the students to do the activity mentioned in the task sheet.
- Write expressions for the volume of a cube and cuboids' using the algebraic symbols used for Length , Width and height in the annex 19.1

### Students' Role

- Do the activity according to the instructions in the task sheet and the center cubes provided to your group
- Complete the annex 16.1

### Learning Outcome

- Estimate the volume of a cube and cuboids'

An activity related to this is given below

### Quality Input

- Box of matches
- A large box with cuboids' shape

### Teachers' Role

- Give a box of matches and a large box for each group.
- Ask them to estimate, number of box of matches that can be included in the box
- Lead the students to find the volume of large box , finding the volume of a box of matches using it's length, width and height.
- Let them to write the answers for the Questions number 2 in exercise 19.4 , in the pages 79 in text book.

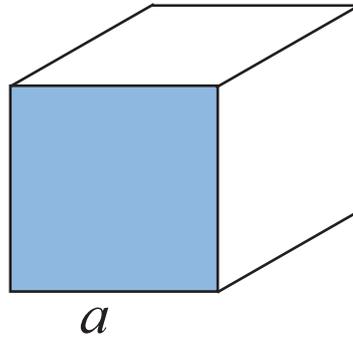
### Students' Role

- Do the activity according to the instructions given in by teacher

## Activity Sheet

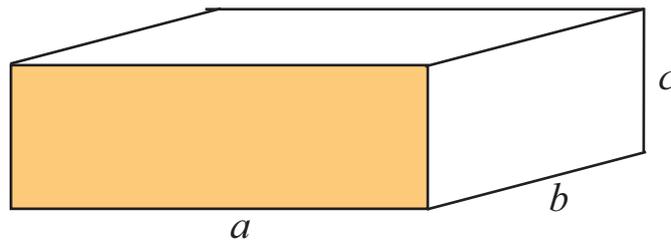
Construct expressions for the volume of the cubes and cuboids given below, using the algebraic symbols given for length, width and height.

**Cube**



Volume of a cube = -----

**Cuboid**



Volume of a cuboids = -----

## 20 Liquid Measurements

**Competency 11:** Works critically with the knowledge of liquid measurements to fulfill daily needs

**Competency level 11.1:** Manipulates liquid measurements involving m

### Learning Outcomes-

- Multiplies by a whole number, measurements of liquid volume expressed in terms of ml and l.
- Divides by a whole number, measurements of liquid volume expressed in terms of ml and l.
- Solves problems related to the multiplication and division of liquid volume measurements.

### Idea to the teacher

In grade 6 students have identified the units use to measure liquids and learned the relationship between *ml* and *l* and also Addition and subtraction of liquid measurements

### Learning Outcome

- Multiply the volume of a liquid given in *ml* and *l* by a whole number

An activity related to this is given below

Refer the pages 106, 107 and 108 in the Teacher's Guide in grade 7.

### Activity 01

### Quality Input

- A task sheet given in the annex 20.1 for each group.
- Empty water bottles and soft drink bottles with different sizes.

## Teachers' Role

- Ask the students to bring empty water bottles and soft drink bottles with different sizes.
- Divide the students in to groups.
- Give some bottles and a copy of the task sheet( annex 20.1)
- Advise the students to complete the table in the task sheet(annex 20.1)
- Lead the students to do the activity given in development of the lesson the page 107 in the teacher's instructional manual
- Let the students to complete the exercises given in page 82 and 83 in the text book.

## Students' Role

- Complete the task sheet (annex 20.1) using the Quantities in the containers provided to your group.
- Do the exercise 20.1 in page number 82and 83in the text book

## Learning Outcome

- Divide the volume of a liquid given in  $ml$  and  $l$  ,by a whole number.
- An activity related to this is given below

## Activity 01

### Quality Input

- A bottle with the capacity of 500  $ml$ .
- A transparent Container with uniform cross section ( glass, Beaker)



- A strip taken from a piece of paper
- Pair of scissors  
Binder gum

## Teachers' Role

- Divide the students in to groups to have different number of students in a group.
- Give transparent container with uniform cross section for each group.
- Put water to fill the bottle with unic volume and put water to the containers with uniform cross section to fill them totally .
- Ask them to cut a strip from a piece of paper and it's length should be equal to the height of the water in the containers provided to you
- Cut the strip in order to divide it the group members equally
- For an example , if the number of members in a group is 5



- Paste this paper in the container
- Ask the students to divide of water with the help of this and given instructions for them to suggest a method to find the volume of the water that each member has got.
- Give instruction to prepare a table to represent, total amount distributed, Number of members in a group and amount of water that each member has got.
- Let the students to complete exercise 20.0 in page 84 in the text book.

## Students' Role

- Do the activity according to the instructions given by the teacher.
- Find the accuracy of the volume obtained using a measuring cylinder.

### Activity Sheet

- Write the name of the bottles that you brought in the first column and write the capacity of it in the second column.
- Then find the amount in 2,3, 5 and 10 such bottles and complete other columns

Name of the bottle brought	Amount in a bottle	Amount in two such bottles	Amount in 3 such bottles	Amount in 5 such bottles	Amount in 10 such bottles

# 21 Ratio

**Competency 4:** Uses ratios to facilitate day to day activities

**Competency level 4.1 :** Shares resources fairly by applying the knowledge on ratios

**Learning Outcomes-**

- Divides a quantity into three according to a ratio.
- Calculates the total quantity when the ratio and the value of one of the terms are given.
- Calculates the values of the rest of the terms when the ratio and the value of one term are given.
- Applies the knowledge on ratios in practical situations

## Idea to the teacher

Students have learn about the ratio between two quantities and have observed about the simplest form of a ratio. It is important to highlight the section of applying the knowledge on ratio in practical situations such as dividing quantities from this lesson.

## Learning Outcome

- Divides a quantity into three according to a ratio.  
An activity related to this is given below.

Refer page numbers 109 -111 in the grade 7 Teachers' Guide

## Activity 01

### Quality Input

For each group,

- Activity sheets included in annex 21.1
- 3 small glass vessels labeled as A, B, C.
- 30 glass balls.

### Teachers' Role

- Group the students in an appropriate way.
- Distribute glass balls and glass vessels among groups.
- Engages the students in the activity according to the activity sheet in annex 21.1
- Guide them for part (b) in 2nd step when necessary.

### Students' Role

- Engage in the activity according to the given activity sheet.

## Learning Outcome

- Calculates the total quantity when the ratio and the value of one of the terms are given
- An activity related to this is given below

## Activity 01

### Quality Input

- 100 buttons – one per group.
- Activity sheets – one per group (annex 21.2)
- 3 vessels labeled as A, B, C.

### Teachers' Role

- Group the students in an appropriate way and distribute activity sheets.
- Distribute a packet of 100 buttons per each group.
- 3 vessels labeled as A, B and C.
- Instruct the students to fill the table in activity sheet by practicing in using buttons and the 3 vessels A, B and C.

### Students' Role

- Complete the part 1 of the activity sheet using the buttons & the vessels labeled as A, B and C given.
- Check whether you can take the same answer found in part I, by doing

## Learning Outcome

- Calculates the values of the rest terms when the ratio and the value of one term are given.
- An activity related to this is given below

## Activity 01

### Quality Input

- 8 cards of maths trail according to the annex 21.3
- Activity sheet in annex 21.4 one per group.

### Teachers' Role

- Group the students and distribute the activity sheet included in annex 21.4
- Display the copies of annex 21.3 in different places of the class (can be used even outdoors)
- Engage the students in the activity according to the guidelines.
- Write one answer in a circle and give it to the students. (Write different answers in different sheets)
- Guide the students to do the exercise 21.3 in page 97 of grade 7 text book.

## Students' Role

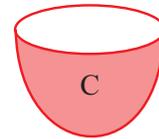
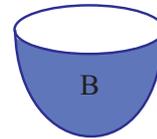
- Find the card relevant to the answer of the activity sheet you received.
- Solve the problem of that card and note down the answer in the next circle.
- Find the card relevant to the answer you noted down.
- Then solve the problem of that card and write down in the next circle. Fill all the circles in this way and complete the activity

Annex 21.1

### Activity sheet

- You have been given 3 vessels labeled as A, B, C.
- Fill the vessels A, B, C with glass balls in the ratio 1 : 2 : 3. Fill the vessels by putting all the glass balls such as 1 for A, 2 for B and 3 for C until they finished.

A : B : C  
1 : 2 : 3



#### Step – 1

- Complete the table below by observing the number of glass balls in the vessels A, B and C separately in each step of filling.

Step	Number of glass balls in A	Number of glass balls in B	Number of glass balls in C
1			
2			
3			
4			
5			

#### Step – II

- (a) Fill the vessels A, B and C by using the same 30 glass balls used in above activity in the ratio 2 : 3 : 5.

Fill the vessels by putting all the glass balls such as 2 for A, 3 for B and 5 for C until the glass balls finished.

Step	Number of glass balls in A	Number of glass balls in B	Number of glass balls in C	Total glass balls
1				
2				
3				

b) Complete the following table by using the knowledge you gained from the above activities.

Total Amount	<b>A</b>	<b>B</b>	<b>C</b>
	1	2	3
60			
300			
Total Amount	<b>A</b>	<b>B</b>	<b>C</b>
	2	3	5
60			
300			

Check whether you may receive the same values you obtained in above table from the calculations below.

It is needed at least 10 glass balls to fill the vessels in the ratio 2 : 3 : 5 (2 + 3 + 5)

A receives as a fraction  $\frac{2}{10}$

Amount A receives from 300  $= \frac{2}{10} \times 300 = 60$

Amount B receives  $= \frac{3}{10} \times 300$

Amount C receives  $= \frac{5}{10} \times 300 = \underline{\underline{150}}$

## Activity sheet

Read the instructions carefully

- Following table shows the number of buttons received by A or B, when a certain amount of buttons are dividing among A and B in the ratio 2 : 3. Find the total number of buttons needed to receive the given number of buttons by A or B.
- Use the buttons and the vessels labeled as A and B you received to practice.

Part – I

Amount received by A	Amount received by B	Total amount
2	---	---
8	---	---
---	15	---
20	---	---
36	---	---
---	60	---

- How many buttons are needed in minimum to divide among A and B in the ratio 2 : 3 ? .....
- Use the following activity to find the total amount, if A receives 20 (5th row of the table)

Amount A receives, as a fraction of the total amount

The part given as '2' in '20' now.

$$= \frac{2}{5}$$

Because the total amount is 5

$$= \frac{20}{2} \cdot 5$$

$$= \text{-----}$$

Compare with the answer received from the above table.

Find the total amount, according to the above manner if B received 15 buttons.

Amount received by B as a fraction =  $\frac{--}{5}$

Total amount =  $\frac{--}{--} \cdot 5$

60

If divided among A and B in the ratio 3:5, A received 15. Then what is the amount for B?

25

When preparing tea mixing milk powder and sugar in the ratio 3:2, then how many milk powder spoons needed for 12 sugar spoons

18

While preparing a cake mix flour and butter in the ratio 5:3. Then what is the mass of flour for 180g of butters

300

A lot of rambutan divided in the ratio 3:4 among sister and brother. If brother got 20 numbers of rambutan, how many rambutan that sister had?

15

In a program reserved more time period for dancing than singing in the ratio 3:2. If time period for singing is 30 minutes, what is reserved time for dancing?

20

If some money divided among A:B:C in the ratio 2:3:5 and A had 240 rupees. Then what is the value that C received?

600

Ratio of the speed of a van and a bus is 2:3. If the bus passed 30km, how long the van passed during that period?

45

When preparing a concrete mixture mixed cement: sand: chips in the ratio 1:2:4. Then how many chip baskets needed for 15 number of cement baskets?

## 22 Percentages

**Competency 5 :** Uses percentages to make successful transactions in the modern world

**Competency level 5.1 :** Analyses the different ways of representing a number

### Learning Outcomes-

- Describes the concept of percentages.
- Uses the symbol % to represent a percentage.
- Writes as percentages, fractions that have denominators which are factors of 100.
- Writes a decimal number of up to two decimal places as a percentage

### Idea to the teacher

This is the first time of introducing the concept of percentages to the students. Percentages are used in discounts, taxes, simple interest, Compound interest, reducing balance method and shares included in next grades

### Learning Outcome

- Uses the symbol % to represent a percentage.

Two activities related to this are given below

### Activity 01

### Quality Input

- 5 Copies of the activity sheet included in annex 22.1

### Teachers' Role

- Divide the students into 5 groups.
- Distribute the activity sheets included in annex 22.1
- Instruct the students to write the shaded part of the figure included in the annex as a fraction of a whole figure in digits and in words.
- Introduce the concept of percentages by consider the way of reading the values.

## Students' Role

- Write the shaded part of each figure of the activity sheet as a fraction of the whole figure in digits and in words.
- Present your findings after the activity

## Activity 02

## Quality Input

- Copies of the activity sheet included in annex 22.2
- $10 \times 10$  grid copied to the transparent sheet in annex 22.3
- Copies of the table included in annex 22.4
- Marker pens.

## Teachers' Role

- Group the students so that one group consists of five students.
- Give the copies of the activity sheets included in annexes 22.2, 22.3 and 22.4
- Instruct the students to shade the squares of the grid in transparent sheet by placing the grid in annex 22.2 on it.
- Instruct the students to complete the table according to the number of squares you shaded
- Conduct a discussion after the activity about the way of writing the number of shaded squares as a fraction and writing and reading a fraction having denominator 100 as a percentage.
- Refer the pages 113, 114 and 115 of grade 07 text book engage the students in the exercise 22.1

## Students' Role

- Observe the activity sheet, Transparent sheet and the table you received.
- Place the  $10 \times 10$  grid in transparent sheet on the numbered grid and shade the squares of the transparent sheet as your wish
- Complete the table according to the number of shaded squares.
- Present your final result at the end of the activity to the class.

## Learning Outcome

- Write as percentages , Fractions that have denominators which are factors of 100
- An Activity related to this is given below

## Activity 01

## Quality Input

- Enough copies of the activity sheet included in annex 22.5
- Felt – tip pens

## Teachers' Role

- Guide students to the activity in the pages 113,114 of Teacher's guide
- Get enough copies of the activity sheet included in annex 22.5
- Group the students in an appropriate way and instruct to complete the activity sheet in following manner.
- A certain portion of the given square (which is divided in to parts of factors of 100) has been shaded. Instruct students to shade the  $10 \times 10$  grid to take the same portion as a part of hundredth
- Instruct to fill the blanks in front of the grid by counting the number of shaded squares, and writing it as a fraction with denominator 100
- Discuss with the students about the way of converting fractions which haven't 100 in denominator into percentages after the activity
- Engage students in the exercise 22.2 of pages 104,105 and 106 of grade 07 text book Describes the concept of percentages.
- Uses the symbol % to represent a percentage.

## Students' Role

- Study the activity sheet you received
- Count the number of shaded part of the given square and shade to represent a same amount as first square.  
1 enough number of squares of  $10 \times 10$  grid
- Fill in the blanks of the given expression using the number of shaded squares of the second figure.(First example is done for you)

## Learning Outcome

- Write a decimal number of up to two decimal places as a percentages

An activity related to this is given below.

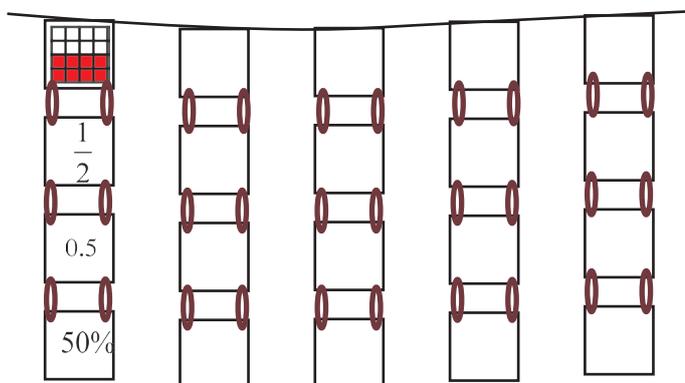
## Activity 01

### Quality Input

- 5 Copies of the activity sheet in annex 22.6
- Twine thread
- Clips

### Teachers' Role

- Divide the students into 5 groups.
- Distribute a set of cards cut out from the activity sheet included in annex 22.6
- Tie the twine thread
- Instruct the Students to hang the set of cards as shown in the diagram in the following order" Figure related fraction related decimal related percentage

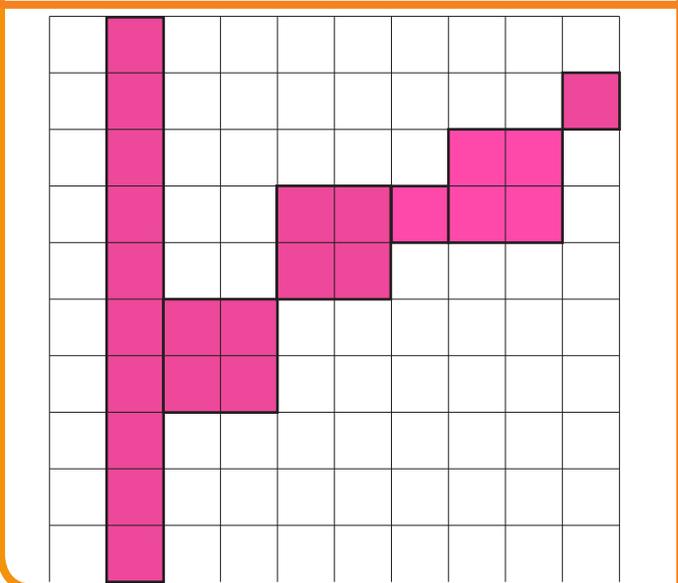
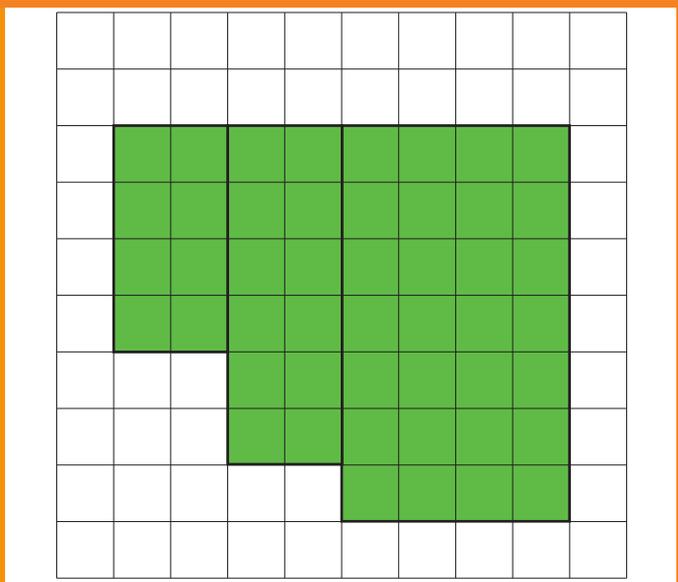
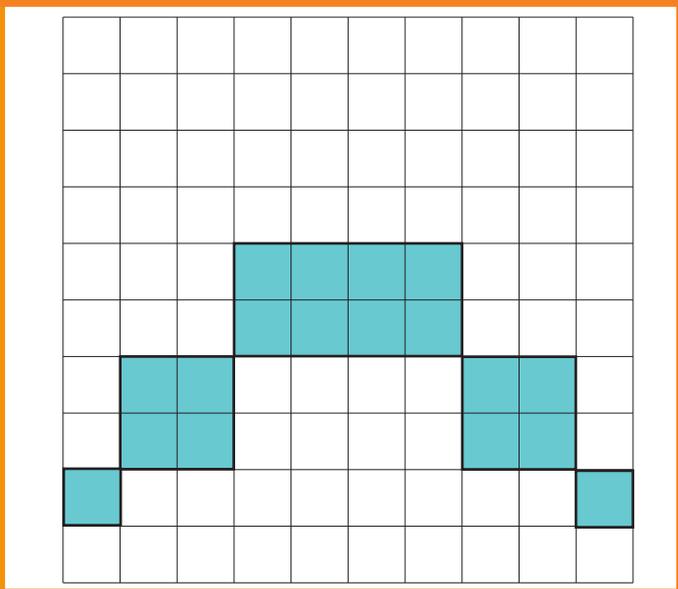


- Instruct the students to hang the cards in ascending or descending order when the cards hanging in crosswise
- Conduct a discussion at the end of the activity about the way of converting a fraction into a decimal and the way of converting a decimal into a percentage with the students.
- Concentrate on writing fractions, decimals and percentages in ascending or descending order
- Engage students in the activity of page 106 & the exercise 22.3 of grade 07 text book

### Students' Role

- Hang the set of cards you received in downwards and crosswise by following teacher's instructions
- Arrange the cards in ascending or descending order when you hang them in crosswise

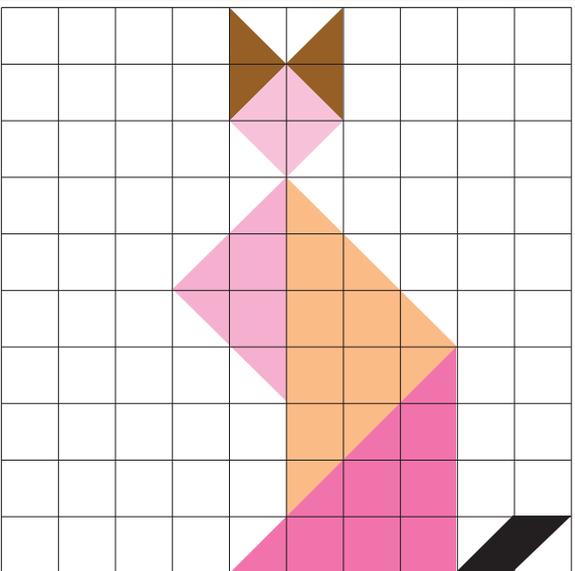
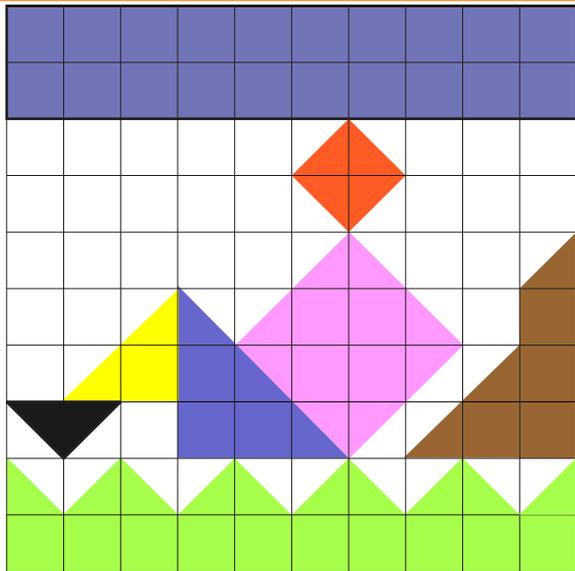
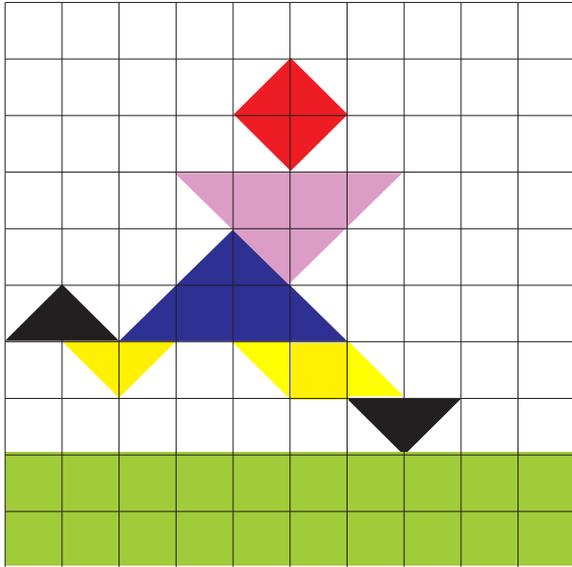
Figure	Shaded portion of the figure as a fraction of the whole figure	Fraction in words
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Figure

Shaded portion of the figure as a fraction of the whole figure

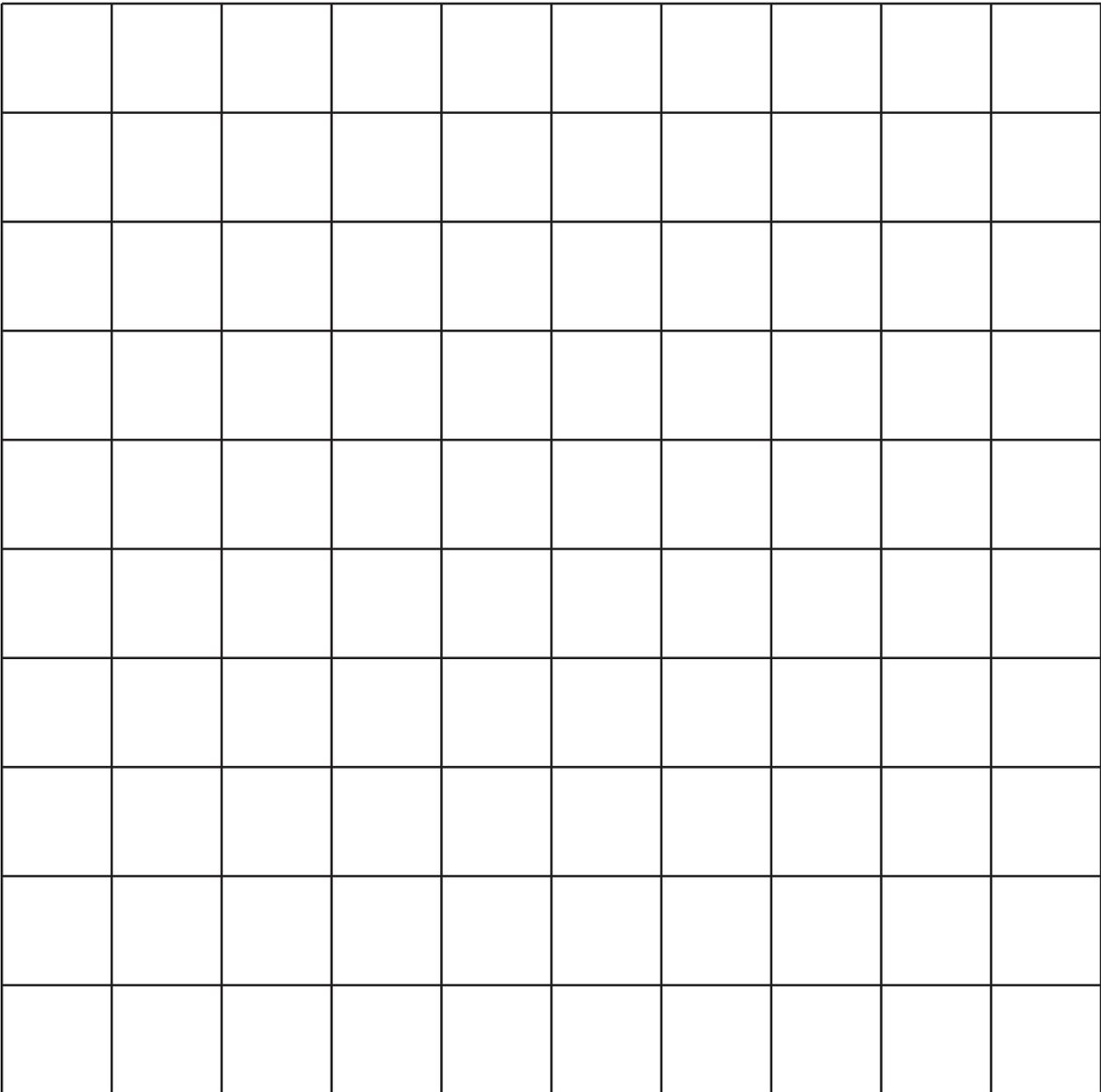
Fraction in words



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Shade the squares of the transparent sheet by placing it on this  $10 \times 10$  grid as your wish

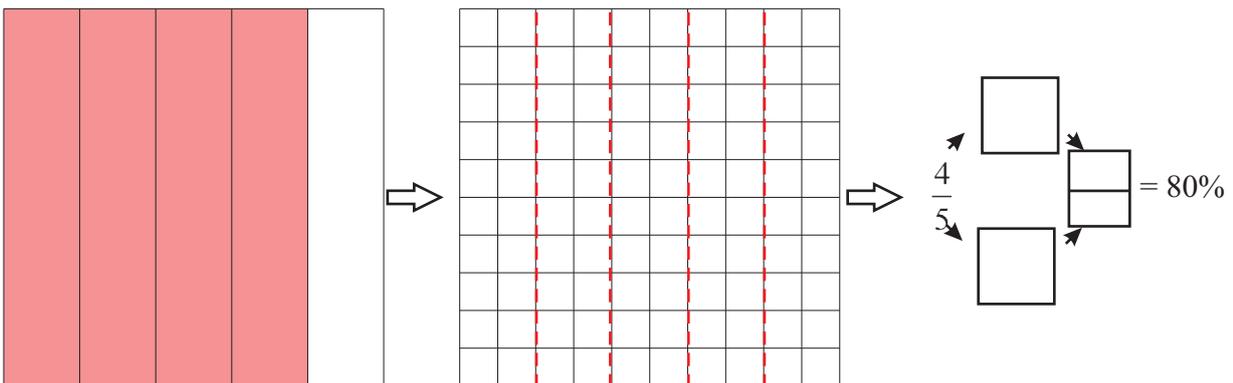
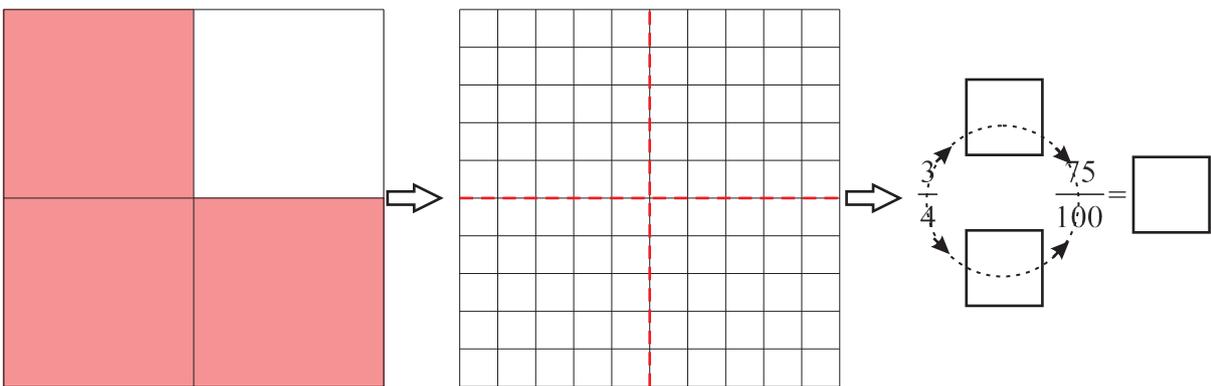
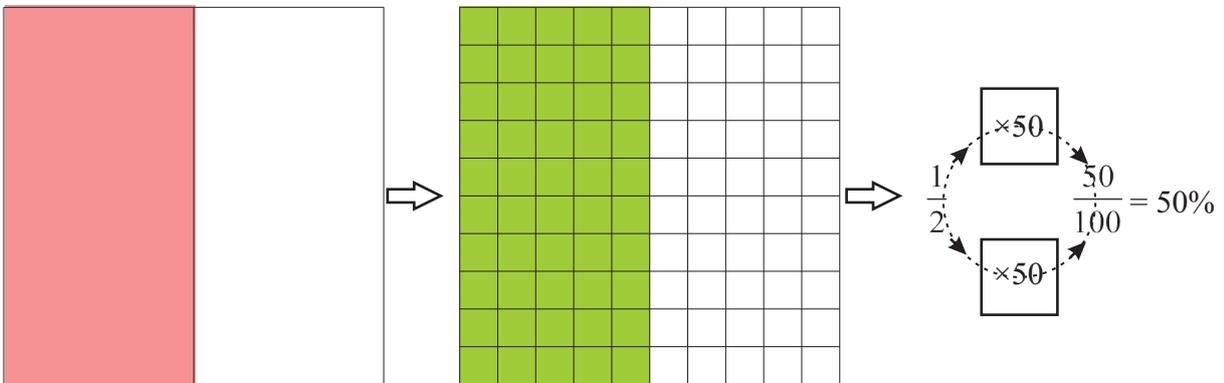
Fill in the blanks of the given table according to the number of shaded squares

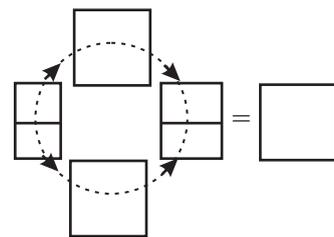
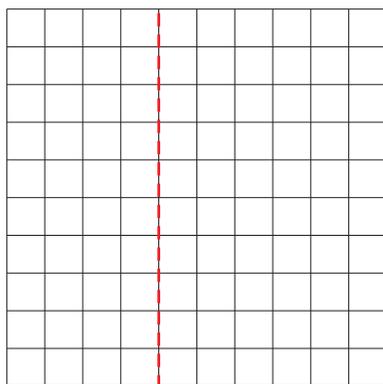
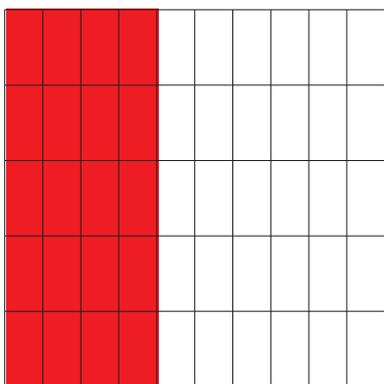
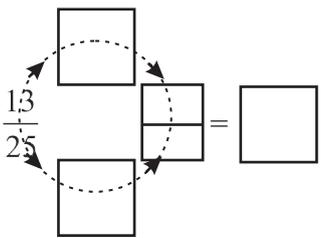
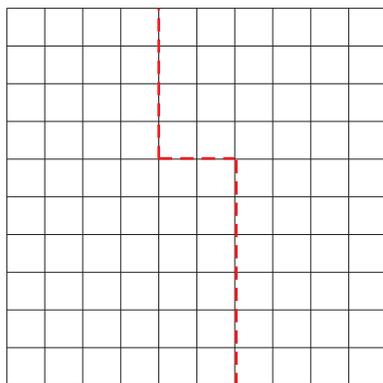
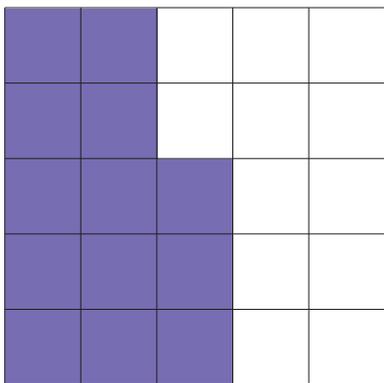
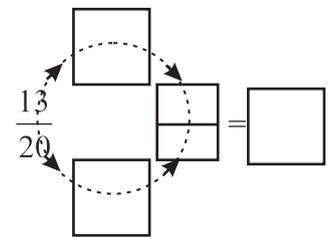
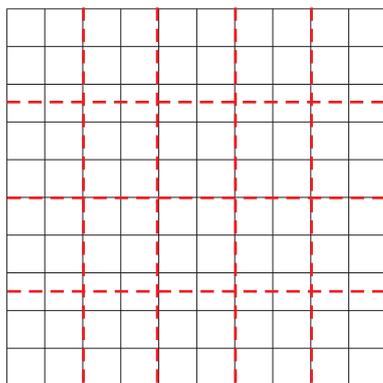
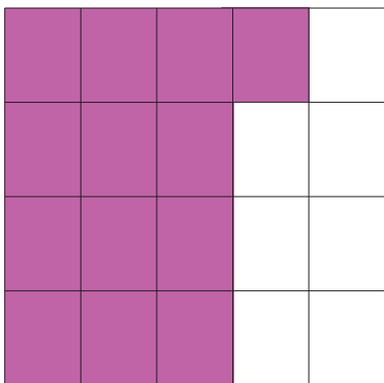
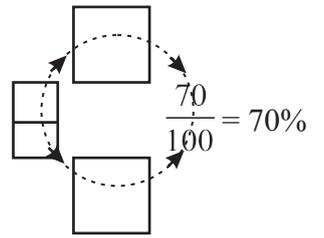
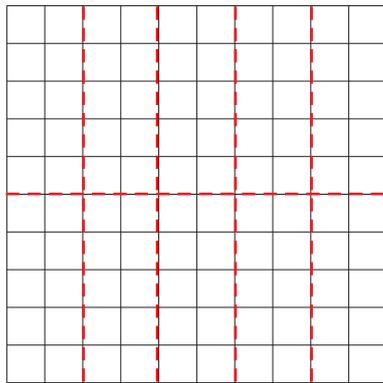
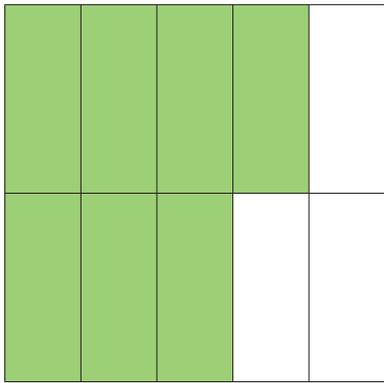


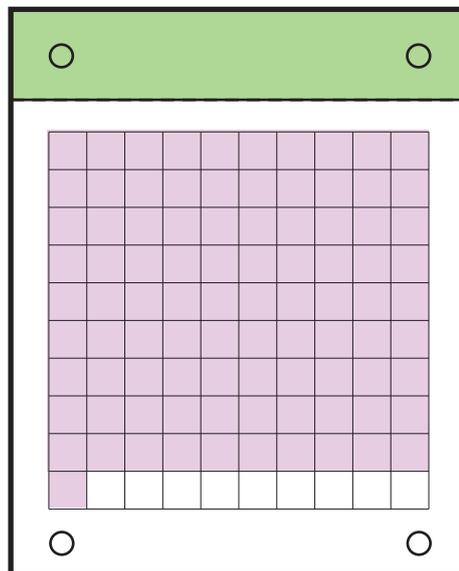
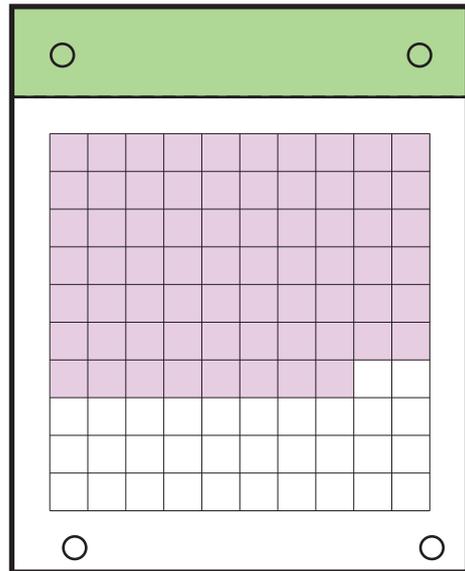
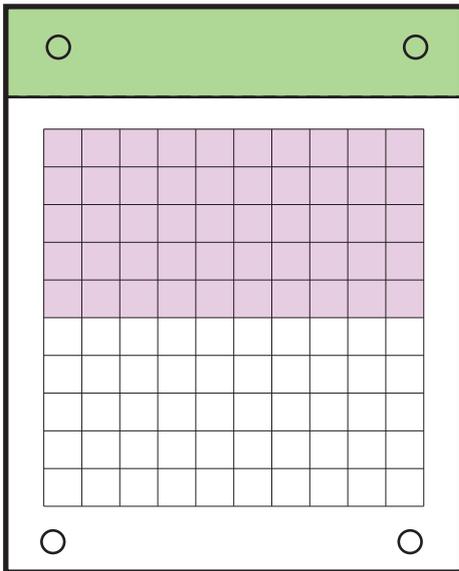
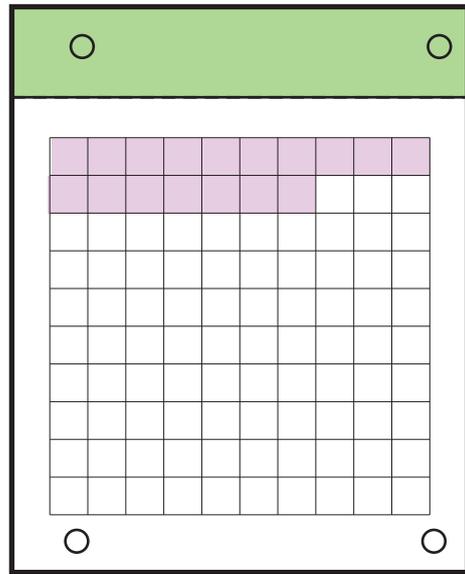
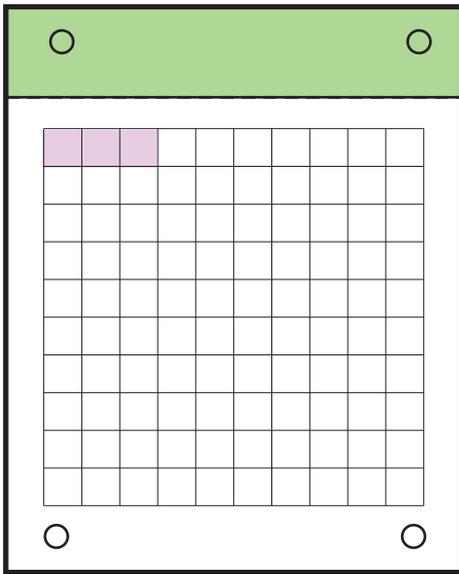
Take photocopies of this 10 × 10 grid in a tracing parent sheets

Fill in the blanks and then complete the table

Number of shaded squares	Number of shaded squares as a fraction of the whole figure	Number of shaded squares as a fraction of the whole figure
1	$\frac{1}{100}$	1%







$$\frac{3}{100}$$

$$\frac{17}{100}$$

$$\frac{50}{100}$$

$$\frac{68}{100}$$

$$\frac{91}{100}$$

0.17

0.91

0.5

0.68

0.03

68%

3%

50%

91%

17%

## 23 Cartesian Plane

**Competency 20:** Easily communicates the mutual relationships that exist between Two variables by exploring various methods

**Competency level 20.1:** Describes the location of a certain place with respect to two mutually perpendicular axes

### Learning Outcomes-

- Accepts that a standard method is required to indicate the position of an object.
- Identifies the Cartesian coordinate plane.
- Expresses the coordinates of a point in the first quadrant of a Cartesian coordinate plane as an ordered pair.
- Writes down the coordinates of a point in the first quadrant of a Cartesian coordinate plane.
- Marks a point with coordinates  $(x, y)$  where  $x, y \geq 0$ , on a coordinate plane.
- In daily activities, determines the location of an object using the knowledge of a coordinate plane

### Idea to the teacher

An integer can be represented on a number line. It is difficult to represent a point outside the number line. In 17<sup>th</sup> century Rene Descartes of French origin presented a method of representing the exact location of a point on a plane using a grid having two axes perpendicular to each other. This coordinate plane is called as Cartesian plane in honor of him

### Learning Outcome

- Accepts that a standard method is required to indicate the position of an object.
- Identifies the Cartesian coordinate plane.

An activity related to these is given below

### Activity 01

### Quality Input

- Activity sheet included in annex 23.1 – one per student.

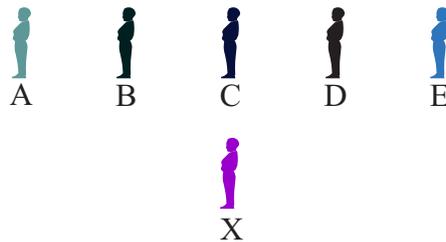
## Teachers' Role

### Step – I

- Take the students out of the class room.
- Give opportunity to stand 5 students in a row.
- Ask another student to stand outside the row and ask the others where is he.

## Students' Role

- Students are stand in following manner.

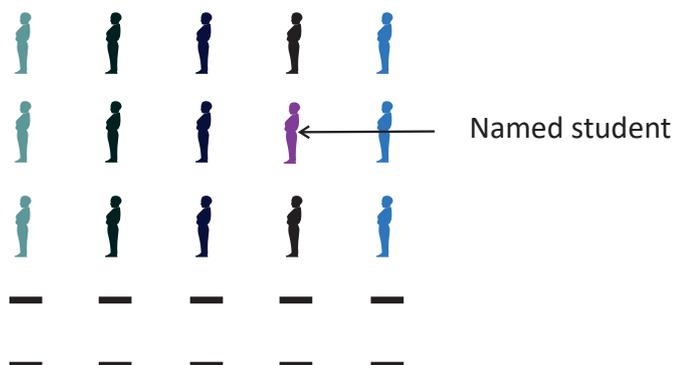


- As in the above, the students A, B, C, D & E are stand in one row and the student X stands outside the row.
- Other students comment on the position of X.
- Realize that it is difficult to describe the position of X.

## Teachers' Role

### Step – II

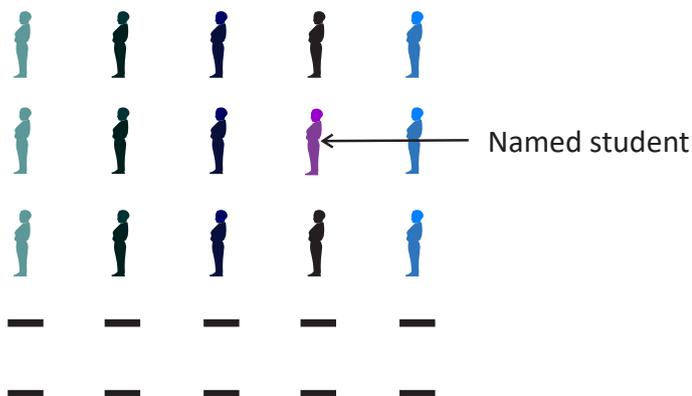
- Give opportunity to all the students of the class to stand in rows and columns.



- Ask to describe the position of a student with respect of to the other students.
- Give the grid in annex 23.1 to the students and direct them to write the names of the students in it.
- Refer the page 108 of the textbook.
- Introduce the coordinates plane.
- Refer page 117 of the teacher's guide

## Students' Role

- Stand in rows and columns as mentioned here under teacher's guidance.



- Express the position of the named student using rows and columns.
- Enter the names of the students in the grid you received.
- Engage in the exercise 23.1 of the textbook.

## Learning Outcome

- Expresses the coordinates of a point in the first quadrant of a Cartesian coordinate plane as an ordered pair.
- Writes down the coordinates of a point in the first quadrant of a Cartesian coordinate plane.
- Marks a point with coordinates  $(x, y)$  where  $x, y \geq 0$ , on a coordinate plane.

An activity related to these is given below

### Activity 01

## Quality Input

- An enlarged grid with named and numbered axes.
- Buttons in two colours 15 in each colour.

## Teachers' Role

- Group the students appropriately and engage them in the activity.
- Distribute the activity sheet in annex 23.2, grid and the buttons among groups.
- Instruct to draw a 5 x 5 grid in the exercise book.
- Engage students in the exercise 23.2 of the textbook.

## Students' Role

- Draw a 5 x 5 grid in the exercise book.

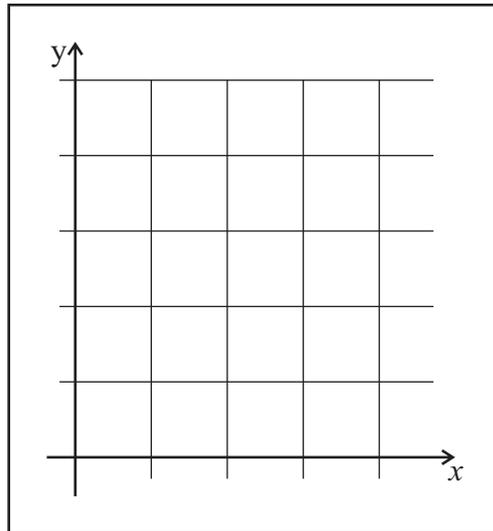
### Activity Sheet

Row 4					
Row 3					
Row 2					
Row 1					
	Column 1	Column 2	Column 3	Column 4	Column 5

## Activity Sheet

- Allow students to stay around the 5 x 5 enlarged grid.

P student ●



● R student

● Q

### 1st opportunity

- Place 15 buttons in same colour on the grid.
- Remove a button, by the student Q.
- Give opportunity to the students P and R to describe the position of the removed button.
- Give that button to the one who describes the position correctly.
- Note down the position of the button in the exercise book.
- Note down the position of the button in the exercise book.
- Note down the position of all the buttons by removing them one by one.

### 2nd opportunity

- Draw a 5 x 5 grid in the exercise book and name and numbered the axes.
- Give buttons in two colours to P and R, 10 per each.
- Give opportunity to place the buttons to P and R on the position Q expresses.
- First accurate attempt is accepted.
- Mark this coordinate on the grid drawn in your exercise book.

## 24 Construction of Plane Figure

**Competency 27 :** Analyzes according to geometric laws, the nature of the locations in the surroundings

**Competency level 27.2 :** Constructs rectilinear plane figures

**Learning outcomes:**

- Constructs a straight line segment of given length using the straight edge and the pair of compasses
- Constructs an equilateral triangle with a side of given length using the straight edge and the pair of compasses.
- Constructs a regular hexagon by means of an equilateral triangle.
- Constructs a regular hexagon by means of a circle.
- Engages in creations using of equilateral triangles and hexagons

### Idea to the teacher

To lay the foundation of using the pair of compasses to construct the straight line segment, the triangle and the regular hexagon. So it is important to give the knowledge and skill required to use the pair of compasses to the students.

### Learning Outcome

- Constructs a straight line segment of given length using the straight edge and the pair of compasses
- Constructs an equilateral triangle with a side of given length using the straight edge and the pair of compasses.

An activity related to these is given below

### Activity 01

### Quality Input

Activity sheet included in annex 24.1, a pair of compasses and a pencil for each students

## Teachers' Role

- Distribute quality inputs to all the students
- Instruct to engage in the activity under the guidelines of the activity sheet.
- Discuss with the students about their creations
- Engage the students in the exercise 24.1 on the page 168 of Grade 7 text book

## Students' Role

- Engage in the activity under the instructions of the activity sheet ( annex 24.2 )
- Participate the discussion with the teacher by presenting your creations to the class

## Learning Outcome

- Constructs a regular hexagon by means of an equilateral triangle.

An activity related to this is given below

Refer the pages 121, 122 of Grade 7 Teachers Guide

## Activity 01

## Quality Input

- A4 paper, a pair of scissors and the activity sheet included in annex 24.3 for each student

## Teachers' Role

- Distribute quality inputs and the activity sheet for each student
- Instruct to engage in the activity according to the instructions given in activity sheet
- Monitor students while they are engage in the activity and help them when necessary
- Conduct a discussion with students after the activity

## Students' Role

- Engage in the activity according to the instructions of the activity sheet included in annex 24.1
- Discuss with the teacher and with the other students about your creation

## Activity Sheet

### Activity 1.1

Follow the steps below and draw PQ straight line segment with the length of 4.5 cm

- Step I : Draw a straight line segment using a ruler. Mark P near one edge.
- Step II : Keep compass on the ruler and get 4.5cm distance between tip of the compass and the tip of the pencil
- Step III : Keep the tip of the compass on the P point. Then using the tip of the pencil mark the Q point on the straight line segment

Step IV: Answer the question given below

- 1) What is the length between the tip of the compass and the tip of the pencil
- 2) What is the length of the PQ straight line segment?
- 3) Draw a straight line segment,  $AB = 3\text{cm}$

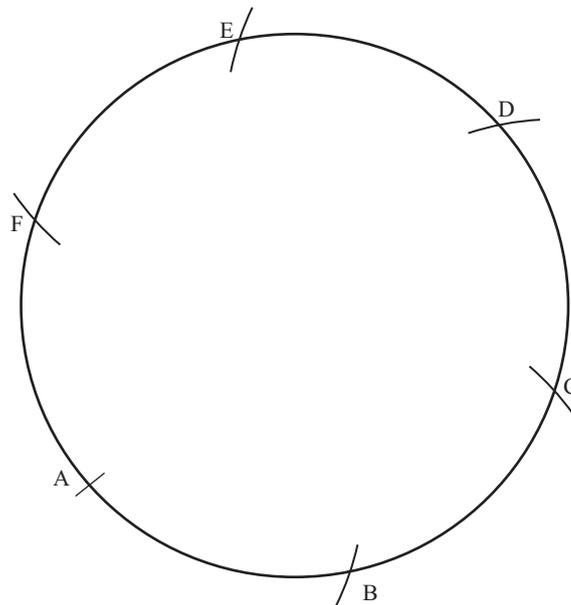
### Activity 1.2

- Step I : Draw a straight line segment using compass and ruler. Mark the line segment as AB
- Step II : Keep the tip of the compass on A point and keeping the same length between pencil tip and the tip of the compass, draw a curve above the line AB
- Step III : Likewise keep the compass tip on B point and draw a curve to cut up previous curve
- Step IV : Cutting point of above two curves mark as C. Then draw AC and BC lines using a ruler
- Step V : Answer the questions given below
- 1) Measure the length of AB, AC and BC line segments of above plane figure
  - 2) Name that plane figure

### Activity Sheet

Follow the below steps to construct a figure using given A4 sheet

- Step I : Using a compass draw a circle of 5 cm radius
- Step II : On the circle mark any point as A
- Step III : Keeping the same distance between the tip of the compass and the pencil tip, draw a curve to cut up the circle, by keeping the tip of the compass on the point A and mark the cutting point as B
- Step IV : Likewise draw curves on B, on C, on D, on E and on F as above method

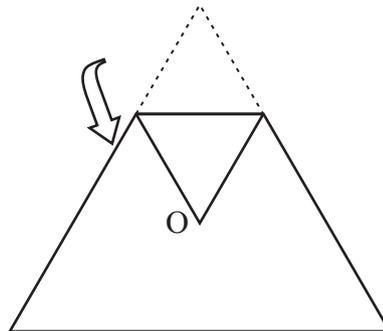
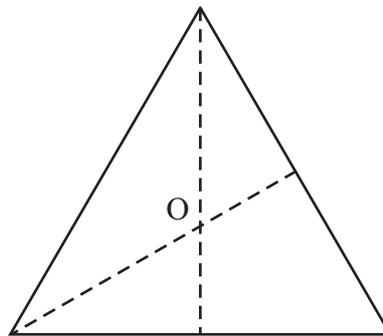


- Step V : Connect A, B, C, D, E and F using ruler
- Step VI : Answer the questions given below
- 1) What is the shape that you obtained above?
  - 2) Measure the length of a side
  - 3) What is the relationship between the radius of the circle and a side of the plane figure?

## Activity Sheet

Follow the below steps to do the activity

- ❖ Draw an equilateral triangle with a side 10cm length in the given A4 sheet
- ❖ Cut and separate it from the sheet
- ❖ According to the below figure, fold it symmetrical by keeping a vertex on other vertex. And find two symmetrical axis.



- ❖ Mark the cutting point of above two axis as O.
- ❖ According to the following figure fold one vertex and keep it on O.

## 25 Solid Objects

**Competency 22:** Engages in creations by exploring various solids.

**Competency level 22.1:** Engages in the creation of models of square pyramids and triangular prisms

### Learning Outcomes-

- Recognizes a square pyramids.
- Draws the net of a square pyramid on a square ruled piece of paper.
- Creates a model of the square pyramid.
- Prepares various nets to make models of square pyramids.
- Identifies the shapes of the faces of a square pyramid, the faces with identical shapes and the edges of equal length.
- Recognizes a triangular prism.
- Draws the net of a triangular prism on a square ruled piece of paper.
- Creates a model of a triangular prism.
- Prepares various nets to make models of triangular prisms.
- Identifies the shapes of the faces of a triangular prism, the faces with identical shapes and the edges of equal length.
- Determines the number of edges, vertices and faces that various square pyramids have.
- Determines the number of edges, vertices and faces that various triangular prisms have

**Competency level 22.2:** Investigates the relationships between the properties of solids

### Learning Outcomes-

- Recognizes that square pyramids/triangular prisms satisfy Euler's Relationship:
- $\text{Number of vertices} + \text{Number of faces} = \text{Number of edges} + 2$
- Investigates whether the various solids found in the environment satisfy Euler's relationship.
- Engages in creations that contain square pyramids and triangular prisms.

### Idea to the teacher

The solids cube, cuboid and regular tetrahedron have been identified in grade 6 from grade 7 lesson it is expected to identify square pyramid and triangular prism, construct Euler's relation by observing the relationships between the elements of solids having straight edges and verify Euler's relation for solids

## Learning Outcome

- Recognizes a square pyramid.
- Draws the net of a square pyramid on a square ruled piece of paper.
- Creates a model of the square pyramid.
- Prepares various nets to make models of square pyramids.
- Identifies the shapes of the faces of a square pyramid, the faces with identical shapes and the edges of equal length.

An activity related to these is given below

Refer pages 124, 125, 126 of grade 7 Teacher's Guide and pages 124, 125 of grade 7 text book.

## Activity 01

## Quality Input

- Copy of annex 25.1, 25.2, and 25.3
- Card board
- Glue, scissor

## Teachers' Role

- Engage the students with revised exercise in page 123 and 124
- Distribute the dot sheet in annex 25.1 for each students
- Give instructions to complete the square pyramid by connecting AB, AD,BC,DC, CE, AE, DE, BE
- Distribute annex 25.2 to each students and let students to past it in cardboard with the extra margin of the box
- Assist student to prepare the pyramid using given net and help to complete 25.3

## Students' Role

- Engage in the activity under teacher's guidance.

## Learning Outcome

- Recognizes a triangular prism.
- Draws the net of a triangular prism on a square ruled piece of paper.
- Creates a model of a triangular prism.
- Prepares various nets to make models of triangular prisms.
- Identifies the shapes of the faces of a triangular prism, the faces with identical shapes and the edges of equal length.

An activity related to these is given below

Refer page numbers 125 and 126 in the grade 7 Teachers' Guide

## Activity 01

### Quality Input

- Scissor, Glue bottle, Cello tape, cardboard
- Activity sheet included in annex 25.4, 25.5, 25.6

### Teachers' Role

- Distribute the dot sheet in annex 25.4 for each students
- Give instructions to complete the square pyramid by connecting PQ, QT, TS, ST, PR, QR, SU, TU
- Distribute annex 25.5 to each students and let students to past it in cardboard with the extra margin of the box
- Assist student to prepare the pyramid using given net and help to complete 25.6

### Students' Role

- Engage in the activity under teacher's guidance.

### Learning Outcome

- Recognizes that square pyramid / triangular prism satisfy Euler's relationship (Number of vertices + Number of faces = Number of edges + 2)
- Investigates whether the various solids found in the environment satisfy Euler's relationship

Two activities related to these are given below

## Activity 01

### Quality Input

- Binder sheets, scissor, cello tape
- Demy paper

### Teachers' Role

- Group the students to each group at least four members
- Set a pack using binding sheet such as,  
4 cm x 4 cm square and 4cm base  
5cm perpendicular height triangle
- Distribute above sets and demy sheets to each groups.
- Assist students to prepare the block of pyramid using binding sheets and cello tape
- Instruct students to draw different blocks on demy sheet

### Students' Role

- Engage in the activity under teacher's guidance.

### Activity 02

### Quality Input

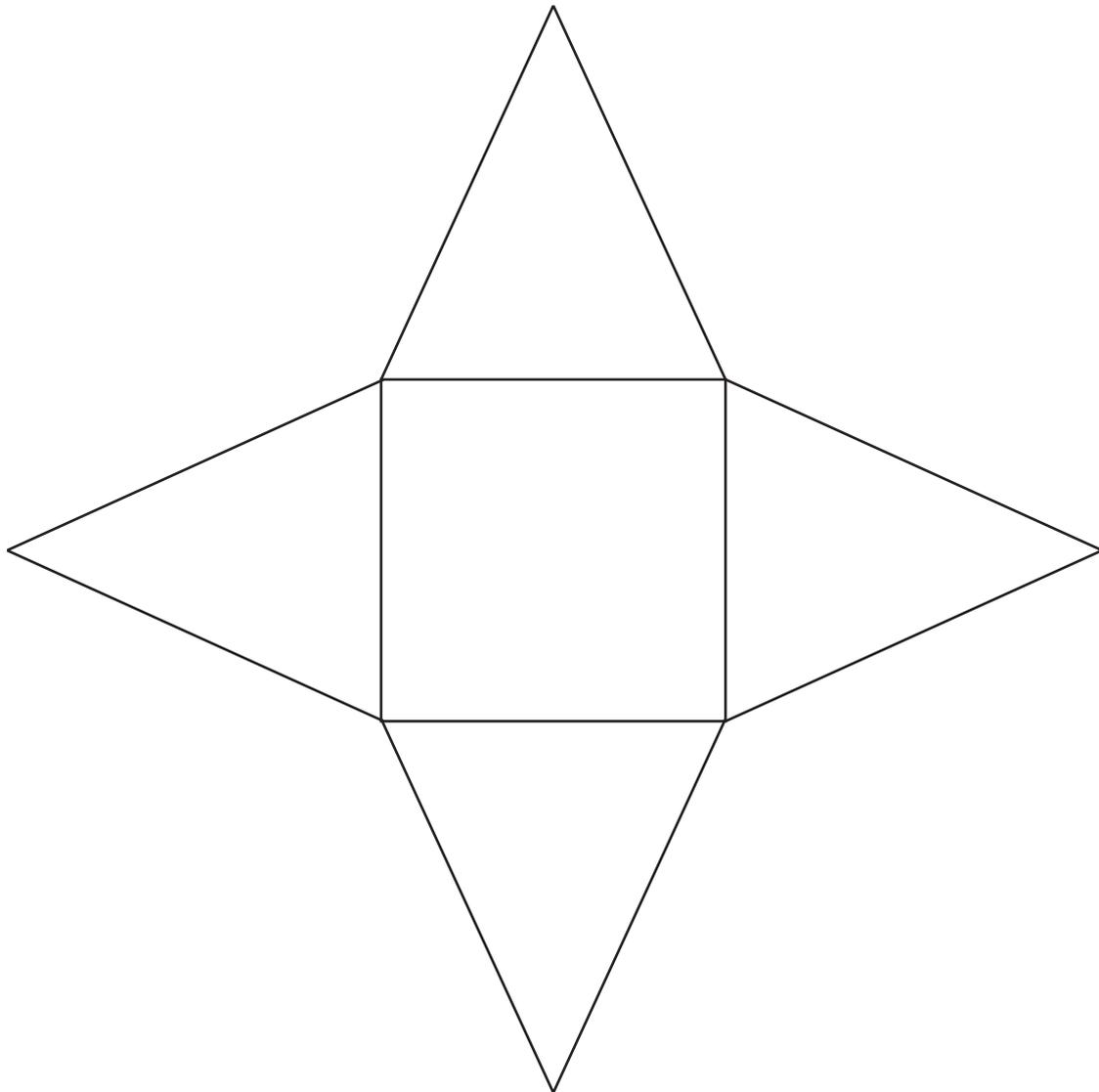
- Binder sheets, scissor, cello tape
- Demy paper

### Teachers' Role

- Group the students to each group at least four members
- Set a pack using binding sheet such as,
  - Two equilateral triangular ( side length is 3 cm)
  - Three Rectangles (3 cm x 7 cm)
- Distribute above sets and demy sheets and cello tape to each groups.
- Explain students how to use cello tape to fix the blocks
- Instruct students to draw different blocks on demy sheet

### Students' Role

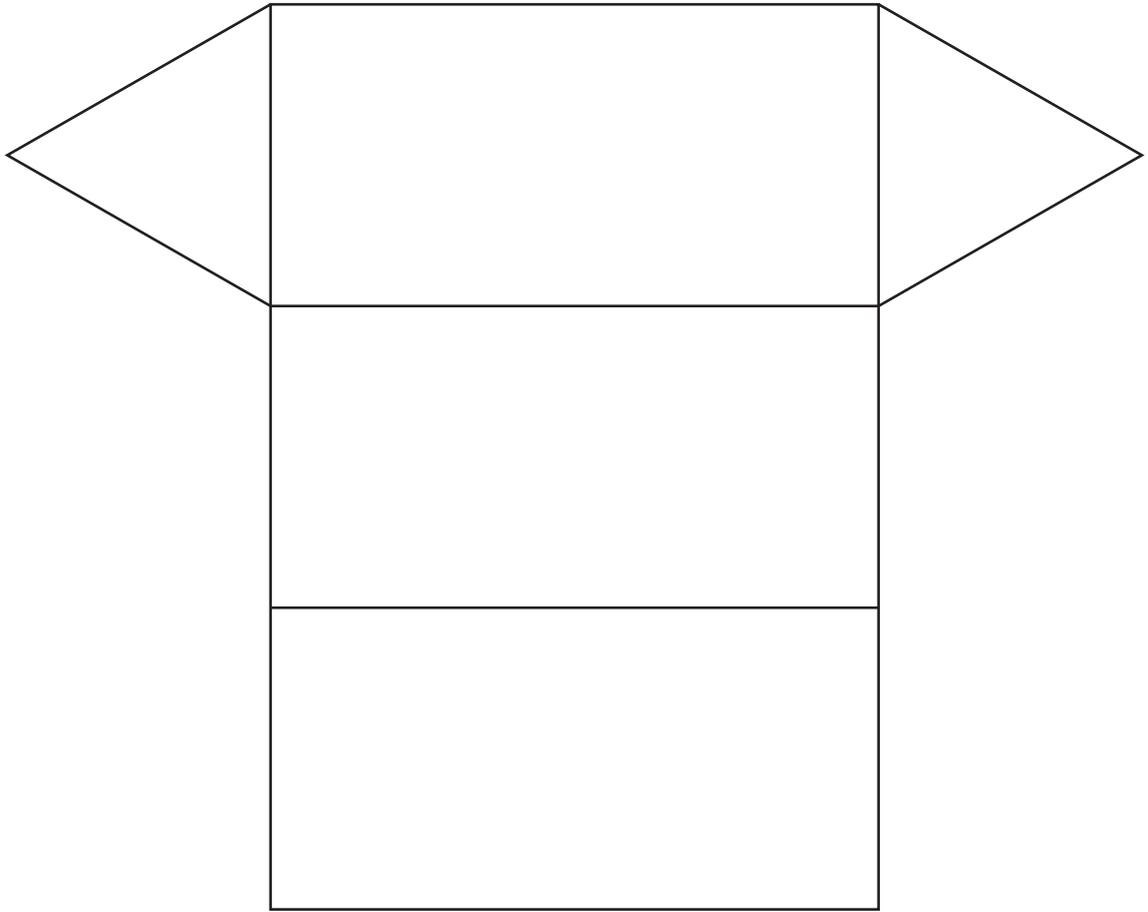
- Engage in the activity under teacher's guidance.



### Activity sheet

In a square pyramid

- ❖ Number of faces
- ❖ Number of edges
- ❖ Number of vertices
- ❖ Edges are equal in length or not
- ❖ Name the geometrical shapes of the faces and draw them



### Activity sheet

In a square pyramid

- ❖ Number of faces
- ❖ Number of edges
- ❖ Number of vertices
- ❖ Edges are equal in length or not
- ❖ Name the geometrical shapes of the faces and draw them

## 26 Representation and Interpretation of Data

**Competency 28:** Investigate the various methods of representing data to facilitate daily work.

**Competency level 28.1:** Represents data appropriately by bar graphs and by multi-bar graphs.

### Learning Outcomes-

- States that bar graphs are drawn using bars of equal width'
- Expresses that bar graphs can be drawn using either vertical or horizontal bars.
- Expresses that the length of a bar represents the relevant number of data
- Represents a given set of data by a bar graph'
- Provides examples of occasions when data of no more than three types are represented in one graph.
- Expresses that when multi-bar graphs are used to represent data, for each occasion, the bars representing the different types are drawn adjoining each other.
- Represents by multi-bar graphs, given data of no more than three types
- Represents data graphically by selecting the appropriate method from bar graphs and multi-bar graphs.
- Confirms the suitability of the method that is selected from bar graphs and multibar graphs to represent given data.

**Competency 29:** Makes predictions after analyzing data by various methods to facilitate daily activities.

**Competency level 29.1:** Analyses information using bar graphs and multi-bar graphs.

### Learning Outcomes-

- By comparing the lengths of the bars, determines the greatest value and when it occurs.
- By comparing the lengths of the bars, determines the least value and when it occurs.
- By comparing the lengths of the bars, determines when equal values occur.
- Compares information by considering the lengths of the bars.
- Recognizes that bar graphs and multi-bar graphs aid in perceiving the information more effectively

### Idea to the teacher

Basic knowledge on collection of data and representation and interpretation of data using tables and picture graphs in given is Grade06. It is expected to represent and interpretation data using column graphs and multiple column graphs, in Grade 07.

### Learning Outcome

- States that bar graphs are drawn using bars of equal width'
- Expresses that bar graphs can be drawn using either vertical or horizontal bars.
- Expresses that the length of a bar represents the relevant number of data

An activity related to these is given below

## Activity 01

### Quality Input

- A copy of the activity sheet in annex 26.1
- Colour pencils

### Teachers' Role

- Group the students appropriately and colour pencils and the copies of the activity sheet included in annex 26.1
- Guide students to draw the column graph using the picture graph in annex 26.1
- Conduct a discussion about the points needed to consider, when drawing column graphs. After the activity (confirm that the width of the columns are equal)

### Students' Role

- Engage in the activity under the instructions of the activity sheet given

### Learning Outcome

- Represents a given set of data by a bar graph'
- Provides examples of occasions when data of no more than three types are represented in one graph.
- Expresses that when multi-bar graphs are used to represent data, for each occasion, the bars representing the different types are drawn adjoining each other.
- Represents by multi-bar graphs, given data of no more than three types
- Represents data graphically by selecting the appropriate method from bar graphs and multi-bar graphs.
- Confirms the suitability of the method that is selected from bar graphs and multibar graphs to represent given data

Two activities related to these are given below

## Activity 01

### Quality Input

- Copies of the annex 26.2
- Demy papers
- Felt-tip pens

### Teachers' Role

- Group students appropriately a week before starting the lesson and distribute a copy of the annex 26.2 by for each group.
- Instruct to complete the table of the annex 26.2 by collecting data from 3 parallel classes of grade 07 under the given fields.  
Ex: Group A- Favorites fruit  
Mango, Papaya, Orange,..  
Group B- Favorites subject  
Maths, Science, English,.....  
Group C- Made of transport of students walking ,public  
transport, Personal vehicles,.....
- Instruct students about the way of using tally marks and the advantages of them when collecting data.
- Guide students to draw a column graph using the total number of students relevant to each field of the annex 26.3A
- Conduct a discussion based on the column graphs relevant to each and every field.

### Students' Role

- Engage in the activity under the guidance of teacher

### Activity 02

#### Quality Input

- Copies of the annex 26.2 with data used in previous activity
- Demy papers
- Felt – tip pens

### Teachers' Role

- Group students and describe method of drawing multiple column graphs referring the pages 133-135 of the text book.
- Guide students to draw a multiple column graph using the table in annex 26.0 on the demy paper.  
Ex: Favorite fruit of the students in each class
- Use the model of 26.3 for this

### Students' Role

- Engage in the activity under teacher's guidance

## Learning Outcome

- By comparing the lengths of the bars, determines the greatest value and when it occurs.
- By comparing the lengths of the bars, determines the least value and when it occurs.
- By comparing the lengths of the bars, determines when equal values occur.
- Compares information by considering the lengths of the bars.
- Recognizes that bar graphs and multi-bar graphs aid in perceiving the information more effectively

An activity related to these is given below

## Teachers' Role

- Display the enlarged copy of the graph included in annex 26.4 to the class.
- Allow randomly selected students to draw the graph relevant to the following situations.
  1. The number of orange juice bottles manufactured in 2016 has increased by 100 than 2015.
  2. The number of bottles of wood apple juice, manufactured in 2016 is 1000.
  3. The number of orange juice bottles has increased by 300 in 2017 than 2016.
  4. The number of mango juice bottles manufactured in all the 3 years is equal.
  5. The number of wood apple juice bottles has decreased by 500 in 2017 than 2016.
- Ask questions from the randomly selected students using the graph related to the annex 26.4 and discuss about the accuracy of the answers.
- Engage the students in the exercise 26.1 in pages 136-139 of the text book.

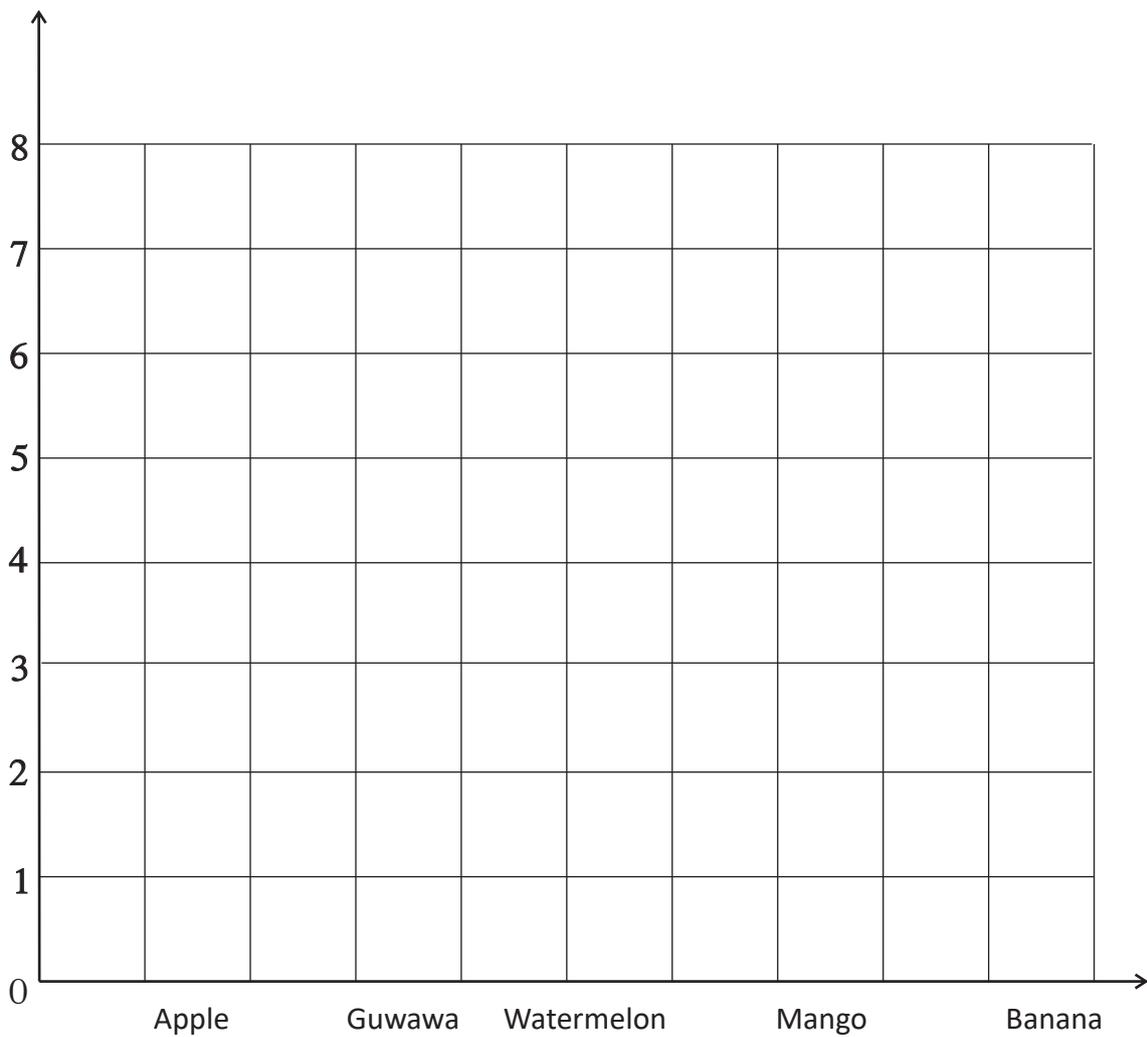
## Students' Role

- Engage in the activity under teacher's guidance.

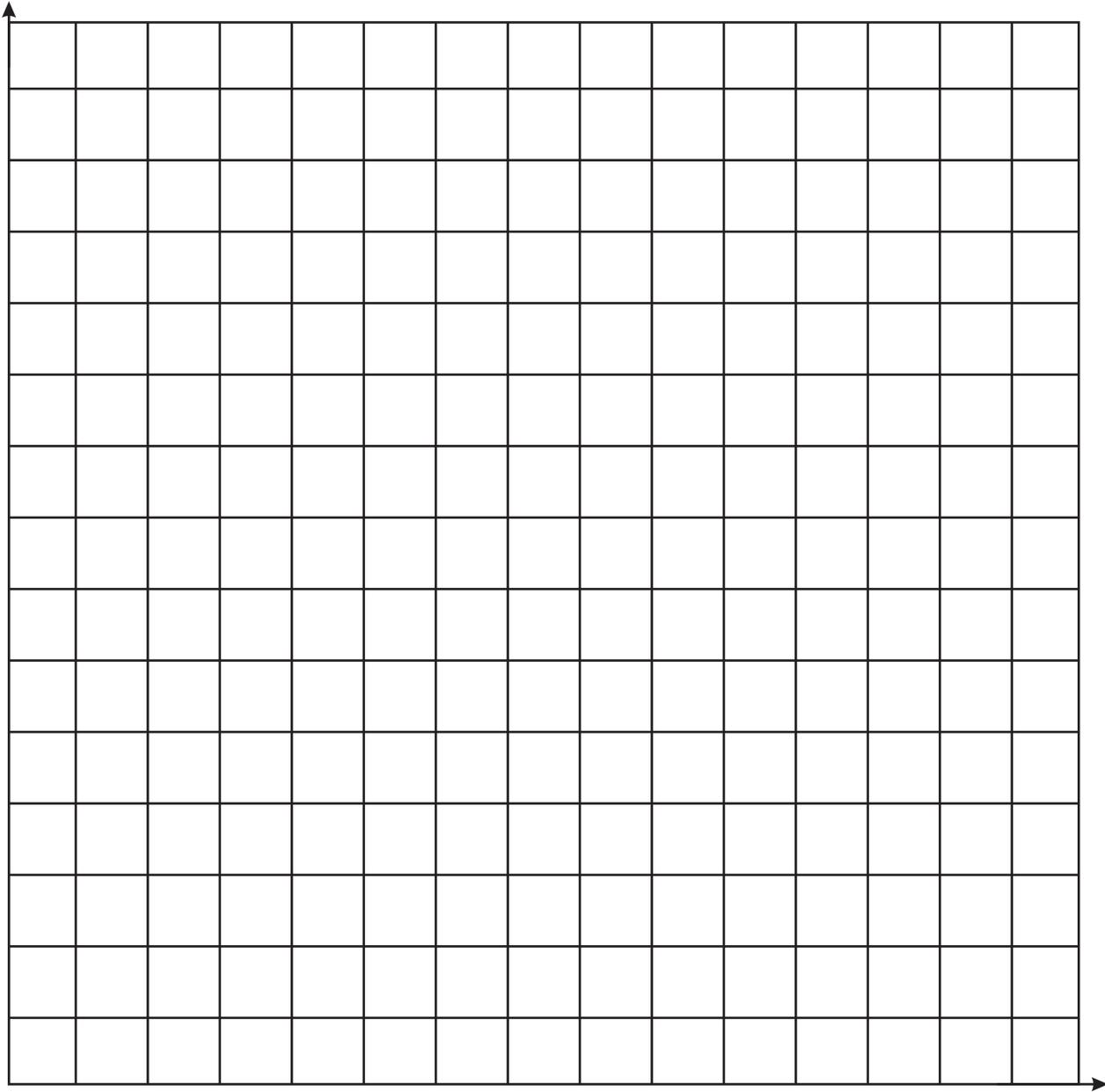
Chart A

Type of fruit	Number of students
Apple	☺☺☺☺☺
Guwawa	☺☺☺☺
Watermelon	☺☺☺☺☺
Mango	☺☺☺☺☺☺☺☺
Banana	☺☺☺☺☺☺

Graph

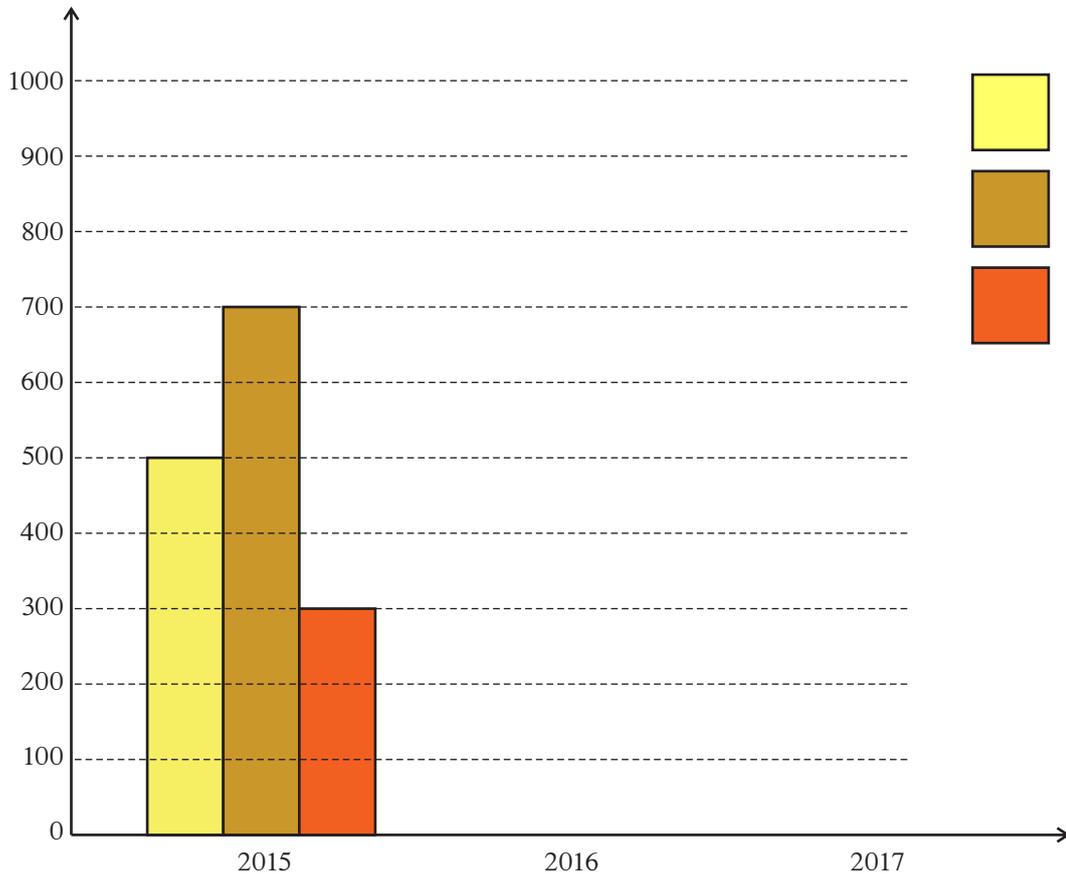


Name of the Field ..... Group .....	Grade 7 ....		Number of students	Grade 7 ....		Number of students	Grade 7 ....		Number of students	Number of students in all three classes
	Tally mark			Tally mark			Tally mark			
① -----										
② -----										
③ -----										



## Activity Sheet

Following multiple column graph shows the number of fruit juice bottles manufactured by a certain company during these years.



❖ Answers the following questions using the graph above

- 1) What is the type of juice that has increased the production gradually?
- 2) Which type of juice has the maximum production in 2015?
- 3) Which type of juice has the minimum production in 2017?
- 4) Which type of the juice has equal production in all the 3 years ?
- 5) What is the incremental of the production of wood apple juice in 2016 than 2015?
- 6) What is the incremental of the production of orange juice in 2017 than 2015?
- 7) Which type of the juice has the maximum production in 2016?
- 8) Find the number of bottles of juice in each type, manufactured in each year separately .

## 27 Scale Drawing

**Competency 26 :** Uses scale diagrams in practical situations by exploring various methods.

**Competency Level 26.1 :** Represents rectangular and square shapes observed in the environment by scale diagrams.

### Learning Outcomes

- Proposes suitable scales to draw a plane figure obtained from the environment with measurements.
- Describes various ways of representing a scale.
- States that an actual length of  $x$  is represented by a length of 1cm in a scale diagram drawn to the scale 1:  $X$ .
- Makes a scale diagram of a rectangular shape in the environment using a suitable scale.
- Makes a scale diagram of a square shape in the environment using a suitable scale.
- Calculates the actual lengths using the scale and the lengths in a scale diagram

### Idea to the teacher

The knowledge gained on scale drawing from this lesson will be able to develop the skills needed to learn the lesson trigonometry in grade 11.

### Learning Outcome

Proposes suitable scales to draw a plane figure obtained from the environment with measurements.

An activity related to these is given below

page numbers 133, 134 in the grade 7 Teachers' Guide

### Activity 01

### Quality Input

- Copies of the attachment 27.1.

### Teachers' Role

- Take the students outside the class room and provide the attachment 27.1. Ask them to complete the table in it.
- Focus your attention on the pages 131 - 134 of grade 7 teacher's guide.

### Students' Role

- According to the teacher's instructions complete the table in attachment 27.1. Some examples for the first column is given in the table.

### Learning Outcome

- Describes various ways of representing a scale..

An activity related to this is given below

Refer page number 134 in the grade 7 Teachers' Guide

### Activity 01

### Quality Input

- Copies of the attachment 27.2.

### Teachers' Role

- Group the students and provide the attachment 27.2 for each group.
- In the attachment, all the lines were drawn to same length. But the length of the lines are different. Ask the students to draw the lines again in order to show that the lengths are different.

### Students' Role

- In the attachment 27.2, all the lines were drawn to same length. But the length of the lines are different. Using a suitable scale draw the lines again in order to show that the lengths are different.

### Learning Outcome

- States that an actual length of  $x$  is represented by a length of 1cm in a scale diagram drawn to the scale 1:  $X$ .
- Makes a scale diagram of a rectangular shape in the environment using a suitable scale.
- Makes a scale diagram of a square shape in the environment using a suitable scale.

An activity related to these is given below

Pay attention on page number 131 - 134 in the grade 7 Teachers' Guide

### Activity 01

### Quality Input

- One drinking straw for two students

### Teachers' Role

- Make groups of 2 students and provide the drinking straws for each group. Give one rectangular object for each group and ask the students to measure its length and breadth using the straw. Instruct the students to draw the scale diagram on a square ruled paper, representing the length of the straw from the side length of a square.
- Ask the students to represent the length of the straw to the side length of a square as a ratio.
- Instruct the students to share their ratio with other groups and complete the table given in the attachment 27.3 by finding the length and breadth of other objects.
- Refer the pages 143, 144 and 145 of the text book.

### Students' Role

- Using the straws provided by your teacher, measure the length and the breadth of the given object.
- Draw the scale diagram on a square ruled paper, representing the length of the straw from the side length of a square.
- Measure the length of the straw and the side length of a square and represent it as a ratio.
- Share the ratio with other groups and complete the table given in the attachment 27.3 by finding the length and breadth of other objects.

### Learning Outcome

- Calculates the actual lengths using the scale and the lengths in a scale diagram.

An activity related to this is given below

### Activity 01

### Quality Input

- Copy of the attachment 27.4 for each student.

### Teachers' Role

- Conduct this as an individual activity.
- Provide the copy of the attachment 27.4 for each student.
- Instruct the students to measure the side lengths of the given figures and complete the table.

### Students' Role

- Measure the side lengths of the figures given in the attachment 27.4 and complete the table.

### Activity Sheet

Shapes in the class room or School Garden	The figure can be drawn in a A4 in same size / can't	If can't draw it give a suggestion

---

 45m

---

 15m

---

 20m

---

 5m

---

 30m

---

 25m

---

 50m

---

 40m

Name of the figure	Actual length	Length of the scale diagram	Actual width	Width of the scale diagram

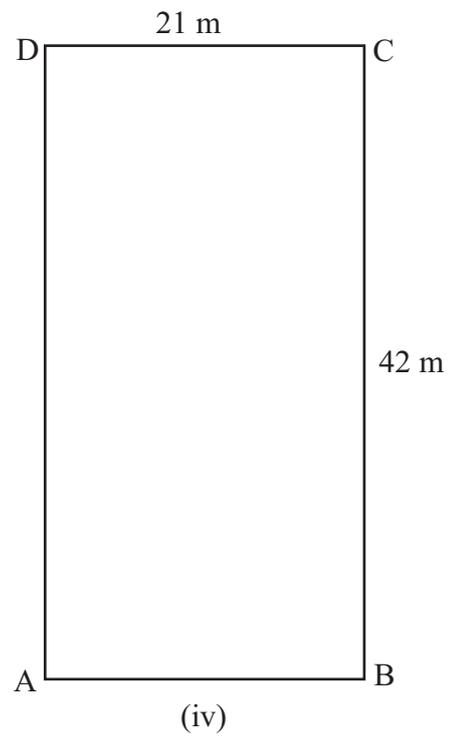
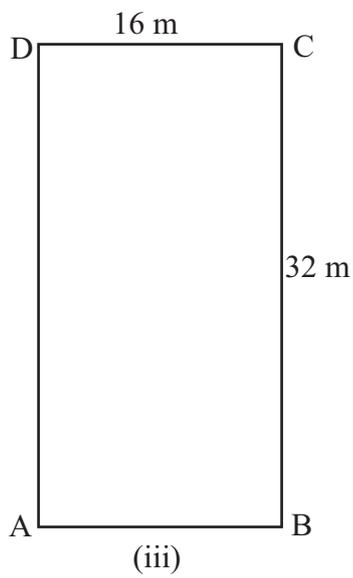
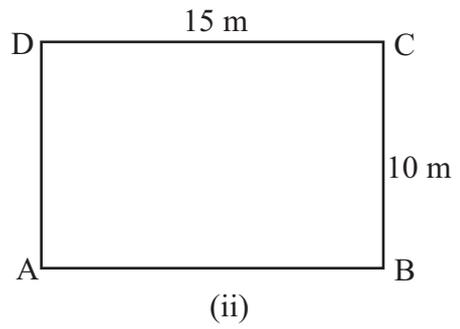
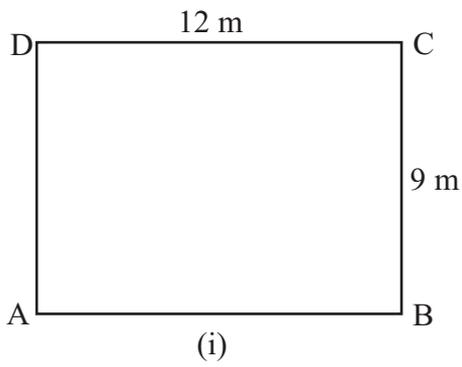


Figure	Actual figure		Scale Diagram		A scale to draw a scale diagram
	Length of AB	Length of BC	Length of AB	Length of BC	
(i)					
(ii)					
(iii)					
(iv)					

