

# 05 - NUMBER LINE

## 5.1 Numbers on a straight line

Nimal and his friends wanted to go to a shop and checked the amounts of money they had. Nimal had Rs. 8, Hemal Rs.10, Kamal Rs.7, Ranjan Rs.12 and Vishan had Rs.5.

We can show these numbers on a straight line in such a way that they are in the ascending order.

We will first examine how to draw a Number line.

A line on which points can be represented by numbers in an accepted order can be called a number line.



In the above number line, only the whole numbers are marked.

The above amounts of money which the five friends had can be marked on this number line.

Let A - be the amount of money Nimal has

Let B - be the amount of money Hemal has

Let C - be the amount of money Kamal has

Let D - be the amount of money Ranjan has

Let E - be the amount of money Vishan has

Now observe the number line drawn.



### Activity 5.1

1. Chandra is 8 years old, Hema is 10 years old, Shanthi is 5 years old and Leena is 4 years old. Mark their ages on a number line.

Let C be Chandra's age

H be Hema's age

S be Shanthi's age

L be Leena's age

2. Sanath, Hemani and Samadara are members of the same family. Their ages are marked on the number line given below.



Fill in the blanks.

A - Samadara's age is .....years.

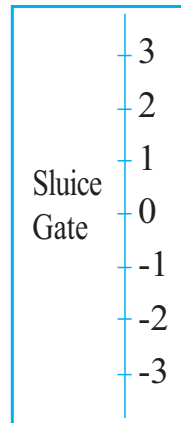
B - Hemani's age is .....years.

C - Sanath's age is .....years.

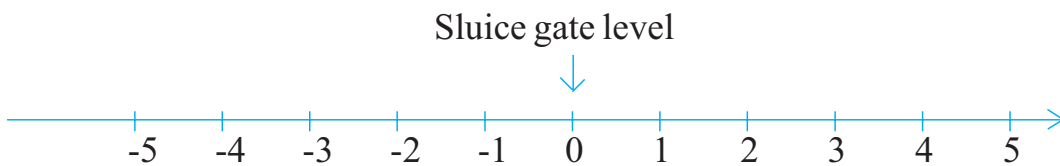
We know that the level of water in the reservoirs increases during rainy seasons or decreases during dry seasons. We have heard statements such as “the well is full” or “there is a little water in the well” etc. The water level in a well is usually stated in relation to marks in the walls of the well. But a person who is not aware of such marks in the well cannot make a statement as above.

When we look at a reservoir, we will notice whether it is full or not. But we cannot decide whether the water level is high or low. A person who is familiar with the reservoir could tell about the water level based on marks familiar to him with which the water level can be compared.

A water gauge resembling a large vertical ruler (as seen in the diagram) may sometimes be seen at a reservoir or a tank.



If the water level in the reservoir is about 10 metres above the sluice gate level the reservoir could overflow. You may have heard statements such as “the water level has decreased by 10 metres” etc. Taking the sluice gate level as zero, a number line could be drawn as follows.



When the water level takes a positive value, then it is above the sluice gate level and when it takes a negative value, it is below the sluice gate level.



### Activity 5.2

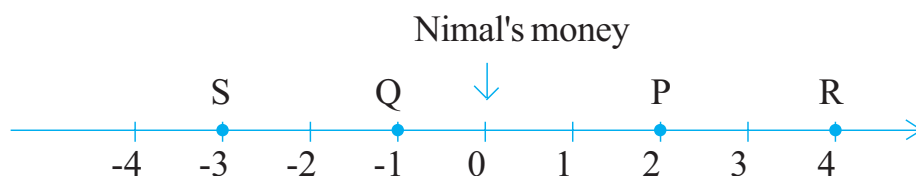
Now we would record in a table the amounts of money Nimal and his friends had. If the cost of a bun is Rs. 8 we will fill the amounts each has in the table given on the next page in relation to the cost of a bun.

Name	Amount of money each has (Rs.)	Cost of a bun (Rs.)	Excess money (Rs.)	Shortfall of money (Rs.)
Nimal	8	8	2	
Hemal	10	8		
Kamal	7	8		
Ranjan	12	8		
Vishan	5	8		

Table 5.1

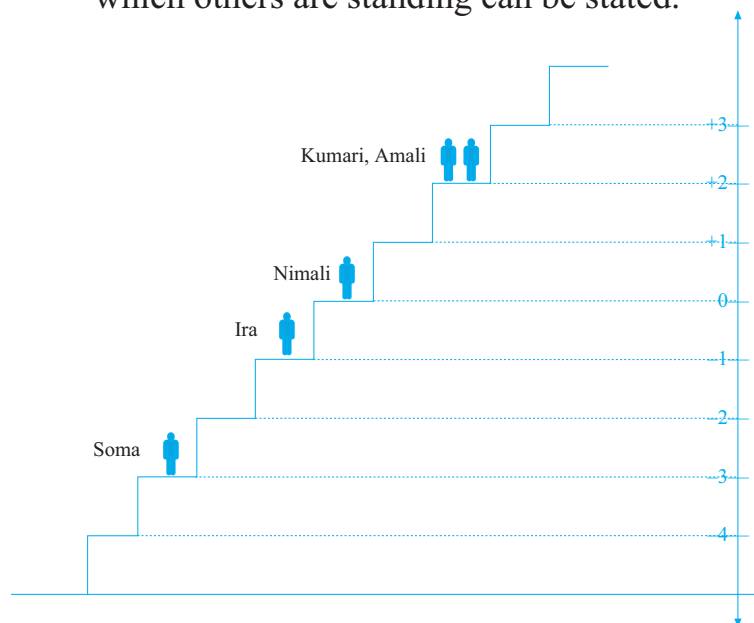
The amount of money in excess could be written as positive (+) and a shortfall could be written as negative (-). Then the excess Rs.2 is +2 and the shortfall of Rs.3 is -3.

Now let us compare the amounts of money that the friends have with the amount that Nimal has. According to the table, Hemal +2, Kamal -1, Ranjan +4 and Vishan -3. Let us show this on a number line.



P - Hemal, Q - Kamal, R - Ranjan, S - Vishan.

Example 1: Diagram given below shows some girls standing on a staircase. Taking the step in which Nimali is standing, as base the steps in which others are standing can be stated.



Amali and Kumari are standing on two steps above Nimali. Ira is standing on 1 step below Nimali and Soma is standing 3 steps below Nimali.

Let us compare the positions of other friends with respect to Nimali. Let us consider those above Nimali as in positive (+) side and those below Nimali are in the negative (–) side. Then Amali and Kumari are at +2 position. Ira is at –1 position and Soma is at –3 position.

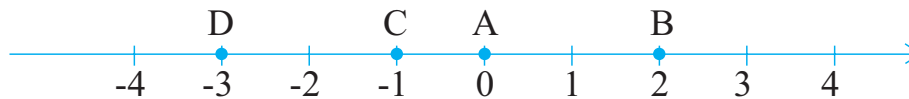
The above information can be shown on a number line.

A - Nimali's position

B - Kumari's and Amali's position

C - Ira's position

D - Soma's position



**Example 2** The following table shows marks obtained by 10 students at a certain test. The total marks is 20.

Name	Marks obtained	Marks Ranmali Obtained	Marks obtained when compared to Ranmali's marks
Nimali	15	10	+5
Ranjala	18	10	+8
Hemali	14	10	+4
Malithi	8	10	-2
Kumudu	7	10	-3
Ranmali	10	10	0
Sarojini	16	10	+6
Amani	20	10	+10
Lavanji	5	10	-5
Sujatha	12	10	+2

Table 5.2

With reference to Ranmali's marks in this example, all marks above hers are positive and all marks below are negative.



### Activity 5.3

Show the marks of table 5.2 on a number line with reference to Ranmali's marks.

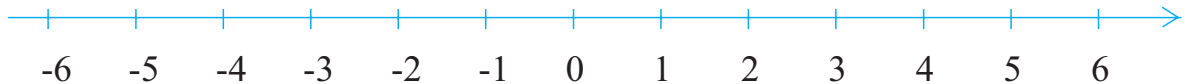
Consider the numbers -5, -4, -3, -2, -1, 1, 2, 3, 4, 5.

.....-5, -4, -3, -2, -1 are negative whole numbers.

1, 2, 3, 4, 5, .....are positive whole numbers.

**Numbers without fractions are known as integers. They are zero, negative numbers and positive numbers.**

Consider the number line given below.



Numbers on the right hand side of 0 are positive integers and the numbers on the left hand side of 0 are negative integers.

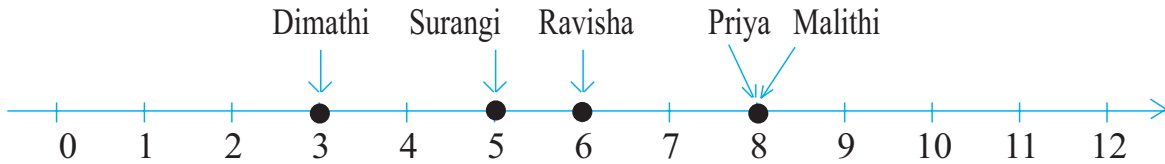
#### Exercise 5.1



- (i) Write the numbers given on the number line.
  - (ii) What are the numbers marked between 1 and 4?
  - (iii) What are the numbers marked between 3 and 8?
- (2) Represent the following on a number line.
- (i) Numbers between 0 and 20, which are divisible by 3.
  - (ii) Whole numbers between 0 and 10 which are not divisible by 2.
- (3) The ages of some children are given below. Nimal 8 years, Sukitha 10 years, Nipuna 13 years, Sarath 11 years, Susil 14 years and Vishal 15 years. Compare the ages of other children with Sarath's age and write their ages using + and - symbols. Represent this information on a number line.

## 5.2 Comparison of numbers:

The number line given below shows the number of correct answers written out of 10 questions by 5 students. The names of students are written at the corresponding numbers.



According to the number line;

Marks obtained by Malithi = Marks obtained by Priya.

Marks obtained by Ravisha is less than marks obtained by Malithi.

### The symbol $<$ is used to show “less than”

Marks obtained by Ravisha  $<$  Marks obtained by Malithi.

Marks obtained by Surangi  $<$  Marks obtained by Ravisha.

### The symbol $>$ is used to show “greater than”

The above facts can also be shown as follows.

The symbols  $<$ ,  $=$ , and  $>$  can be used to compare numbers.

“Marks obtained by Ravisha  $>$  Marks obtained by Suranji”

Example I:  $5 < 7$        $5 = 5$        $10 = 10$   
 $7 > 5$        $8 > 6$        $10 < 15$        $95 > 94$   
 $6 < 8$        $15 > 10$        $93 < 94$

(i) Five is less than seven can be written as  $5 < 7$ .

(ii) Eight is greater than six can be written as  $8 > 6$ .

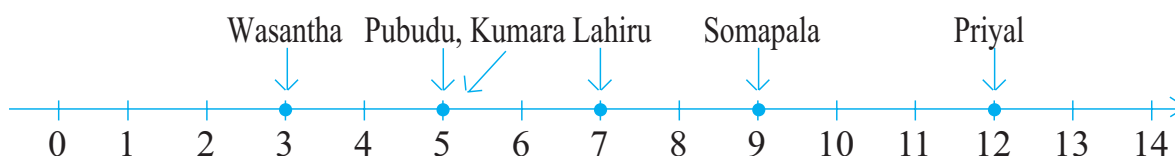
(iii) Ten equals ten can be written as  $10 = 10$ .

Example II:  $3 > 0$      $2 > 0$      $1 > 0$      $0 > -1$   
 $-1 > -2$      $3 > -2$      $-7 > -12$



### Activity 5.4

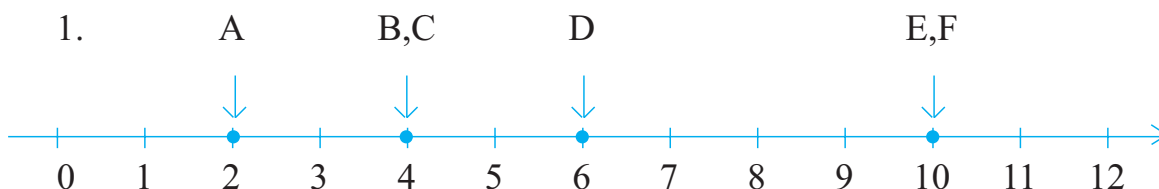
The number line given below shows the number of coins that five children had with them.



Rewrite the following and fill in the blanks using the symbols.

- (i) Number of coins Wasantha has .....number of coins Pubudu has.
- (ii) Number of coins Kumara has .....number of coins Pubudu has.
- (iii) Number of coins Lahiru has .....number of coins Somapala has.
- (iv) Number of coins Priyal has .....number of coins Somapala has.
- (v) Number of coins Priyal has .....number of coins Lahiru has.....  
 number of coins Pubudu has.

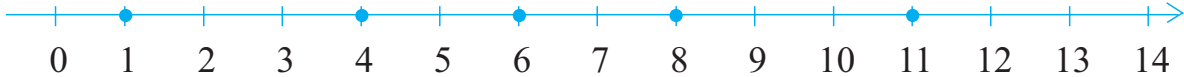
### Exercise 5.2



The above number line shows the ages of 6 children who attended a party. Names of the Children are marked as 'A', 'B', 'C', 'D', 'E', 'F'.

- (i) Who is the eldest child?
- (ii) Who is the youngest child?
- (iii) Who are of equal ages?
- (iv) Name a child older than 'A' and younger than 'D'.
- (v) Who is older than 'B' and younger than 'E'?

(2)



- (i) What is the largest number shown on the above number line?
- (ii) What is the smallest number shown on the above number line?
- (iii) What are the numbers on the number line, between 6 and 11?
- (iv) What are the numbers on the number line, between 3 and 8?
- (v) Write numbers less than 6.
- (vi) Write numbers greater than 8.
- (vii) Are values of numbers increasing or decreasing when moving to the right from the number denoting 3? When moving to the left, are numbers increasing or decreasing.

(3)



- (i) What is the largest number on the above number line?
  - (ii) What is the smallest number on the above number line?
- (4) Fill in the blank spaces using the symbols  $<$ ,  $>$  or  $=$ .
- |                  |                    |                   |
|------------------|--------------------|-------------------|
| (i) 10 ..... -10 | (ii) -7 ..... -5   | (iii) -3 ..... -8 |
| (iv) 0 ..... -3  | (v) -2 ..... 5     | (vi) -4 ..... -4  |
| (vii) 2 ..... -1 | (viii) -1 ..... -1 | (ix) -3 ..... 3   |
| (x) 2 ..... -4   |                    |                   |
- (5) Rewrite the following numbers arranging in the ascending order.
- (i) -1, 4, -3, 0, 5
  - (ii) 3, -7, 5, -1, 7
  - (iii) 0, -4, -2, +4, +2

### Additional Exercises

1. Draw a number line and mark the following numbers.  
-2, +2, +5, -3, 1, 4, 0, -7, -6



2.



What are the numbers marked on the above number line?

3. Rewrite using the symbols  $<$ ,  $>$  or  $=$  to fill in the blanks.

- |                    |                    |                |
|--------------------|--------------------|----------------|
| (i) 3.....7        | (ii) -3.....-5     | (iii) 0.....-2 |
| (iv) -7.....7      | (v) 12.....12      | (vi) 1.....0   |
| (vii) -4.....-4    | (viii) -25.....-10 |                |
| (ix) -150.....-200 | (x) 1000.....1005  |                |

4. Arrange each set of numbers in the ascending order.

- (i) 3, -5, 0, 2, -1, 8
- (ii) -7, -4, 4, -1, 6
- (iii) 5, 6, -3, -1, 8, -5
- (iv) 10, -8, -7, 0, 1, 5, -6

5. Arrange each set of numbers in the descending order.

- (i) 1, 2, -2, 15, 6, -5, -8, 10
- (ii) -3, -2, -5, -8, -15, 1, 2
- (iii) 12, -9, -12, 5, 2, -11, -7, 3

## Summary

- \* Whole numbers positive or negative and 0 are known as integers. Whole numbers with + sign are known as positive integers and whole numbers with - sign are known as negative integers.
- \* A straight line on which points can be represented by numbers in an accepted order is called a number line.
- \* The symbols  $>$ ,  $=$  and  $<$  are used to show greater than, equal to or less than for comparison of numbers.