



Musaeus College

Study Pack 2 / Week 2 / March 2020

Grade : 11

Subject : Mathematics

Medium : English

Lesson 1:

PERCENTAGES

Unit 9

There are different methods to calculate interest for a loan

- Simple interest method (done in Grade 10)
- Reducing balance method (will discuss in Grade 11)
- Compound interest method (will discuss in Grade 11)

Calculating interest under the reducing balance method

- Under this method a part of the loan has to pay in each month.
- Interest will be calculated only for the balance of the loan.
- Since the loan is reducing in each month this method is called as the reducing balance method.

Eg :

Kumara bought a washing which worth Rs 35 000 .00 under the reducing balance method by paying Rs 5 000.00 as a down payment .If the rate of interest is 8 % and the number of installments is 5.

Worth of the washing machine - Rs. 35 000.00

Down payment - Rs. 5 000.00

Balance of the loan - Rs. 35 000.00-Rs 5 000.00 = Rs. 30 000.00

Part of the loan should be paid monthly - $\text{Rs } 30\,000.00 \div 5 = \text{Rs } 6\,000.00$

Therefore each and every month $\text{Rs } 6\,000.00$ will be reducing from the initial loan.
We can calculate the interest as follows.

$$\text{Interest for the first month} = \text{Rs } 30\,000 \times \frac{8}{100} \times \frac{1}{12}$$

$$\text{Interest for the second month} = (\text{Rs } 30\,000 - 6\,000) \times \frac{8}{100} \times \frac{1}{12}$$

$$\text{Interest for the third month} = (\text{Rs } 30\,000 - 6\,000 - 6\,000) \times \frac{8}{100} \times \frac{1}{12}$$

Similarly


$$\text{Interest for the fourth month} = \text{Rs } 1\,2000 \times \frac{8}{100} \times \frac{1}{12}$$


$$\text{Interest for the fifth month} = \text{Rs } 6\,000 \times \frac{8}{100} \times \frac{1}{12}$$

$$\text{Total interest} = \text{Rs } 30\,000 \times \frac{8}{100} \times \frac{1}{12} + \text{Rs. } 24\,000 \times \frac{8}{100} \times \frac{1}{12}$$


$$+ \text{Rs } 18\,000 \times \frac{8}{100} \times \frac{1}{12} + \text{Rs } 12\,000 \times \frac{8}{100} \times \frac{1}{12} + \text{Rs. } 6\,000 \times \frac{8}{100} \times \frac{1}{12}$$

$$= \text{Rs } 6\,000 \times \frac{8}{100} \times \frac{1}{12} \times (5+4+3+2+1)$$


 (Part of the loan should be paid monthly)
 x



 (rate of interest per month)x(month units)



 (5+4+3+2+1)

Total interest = Part of the loan should be paid monthly x (rate of interest per month)x(month units)

Lesson 2:

Month units

Using the knowledge of arithmetic progression we can calculate the number of month units as follows.

Number of installments	Number of months units	
5	$5+4+3+2+1$	$\frac{5(5+1)}{2} = \frac{5 \times 6}{2}$
8	$8+7+6+5+4+3+2+1$	$\frac{8(8+1)}{2} = \frac{8 \times 9}{2}$
10	$10+9+8+7+6+5+4+3+2+1$	$\frac{10(10+1)}{2} = \frac{10 \times 11}{2}$
n	$n+(n-1)+(n-2)+\dots+1$	$\frac{n(n+1)}{2}$

Activity

Calculate the number of month units for the following monthly installments

- 1) 12 installments
- 2) 15 installments
- 3) 3 years
- 4) 5 years

Lesson 3

Finding monthly installment

$$\text{monthly installment} = \frac{\text{loan} + \text{total interest}}{\text{Number of installments}}$$

Ex : Mr. Perera borrow a loan of Rs. 600 000.00 under reducing balance method at the rate of 15 % p.a. and if he has to settle it within two years,

*find out the part of the loan should be paid per month?

$$\frac{\text{Rs } 600\,000}{24} = \text{Rs } 25\,000.00$$

*find out the number of month units?

$$\frac{24}{2} \times 25 = 300$$

*find out the total interest?

$$\text{Rs } 25\,000 \times \frac{15}{100} \times \frac{1}{12} \times 300 = \text{Rs } 93\,750.00$$

*calculate the monthly installment?

$$\frac{\text{Rs } 600\,000 + \text{Rs } 93\,750}{24} = \text{Rs } 28\,906.25$$

Lesson 4

Complete 1 and 2 questions in exercise 9.1 in the text book.

Lesson 5

Complete 3 and 4 quotations in exercise 9.1 in the text book.

Lesson 6

Answer all the questions, related to this lesson in 2018/2019 Western province second term papers.

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