



Provincial Educational Department Sabaragamuwa

Subject:- Mathematic

28 Week

Grade 10

Preparation:-M Chandrasiri Nakkawita M.V

RATES

$$\text{Speed} = \frac{\text{Distance travelled}}{\text{Time taken}}$$

Units

Second = s

hour = h

kilometer = km

meter = m

kilometer per hour = kmh^{-1}

meter per second = ms^{-1}

Example :-

1. A train travels 1800km in 2 hours. Find the speed of the train

$$\text{Speed of train} = \frac{180km}{2h} = \underline{90kmh^{-1}}$$

2. The speed of an aircraft is $210kmh^{-1}$. How far does that plane travel in 20 minutes.

$$\text{Speed} = \frac{\text{distance}}{\text{Time}}$$

$$\text{Distance travelled} = 210 \times \frac{20}{60} = 70km$$

$$\text{distance} = \text{Speed} \times \text{Time}$$

3. How long does it take for a 30m long train traveling at speed $90kmh^{-1}$ to cross a 45m long platform.

$$\text{The total distance the train must travel to cross the platfo} = 45m + 30m = 75m$$

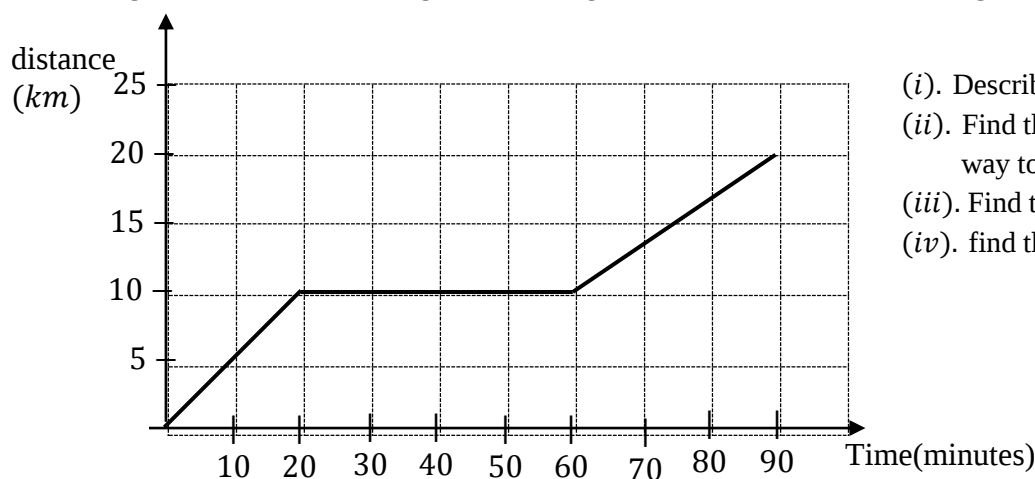
Find the time it takes for the train to travel 75m

$$\begin{aligned} \text{Speed} &= 90kmh^{-1} \\ &= \frac{90 \times 1000}{60 \times 60} ms^{-1} = 25ms^{-1} \end{aligned}$$

$$\begin{aligned} \text{Time} &= \frac{\text{Distance}}{\text{Speed}} \\ &= \frac{75m}{25ms^{-1}} = \underline{3 \text{ Second}} \end{aligned}$$

Do the Exercise 22.1 at No 46/47 on page 02 of Grade 10 Mathematics Textbook

4. Below is a long -distance chart showing Amal leaving his mother's house and returning.



- (i). Describe his journey
- (ii). Find the speed when he on the way to home
- (iii). Find the speed on the way back
- (iv). find the mean speed

Answer

(i). Went to Mother's house about 20 minutes from home' Stayed at home for 40 minutes and returned in 30 minutes.

(ii). Time - 20 minutes = 1200 second

distance - 10km = 10 000m

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{10\,000}{1200} = \frac{25}{9} \text{ ms}^{-1}$$

(iii). distance - 10km = 10000m

Time 30 minutes = second 1800

$$\text{speed} = \frac{10000}{1800} = \frac{50}{9} \text{ ms}^{-1}$$

(iv). Mean Speed = $\frac{\text{Total Distance}}{\text{Total time}}$

Total distance = 20km = 20000m

Time = 20 + 30 = 50 minutes = 3000 s

$$\text{Mean Speed} = \frac{20000}{3000} = \frac{20}{3} \text{ ms}^{-1}$$

Question

(i).

Time(h)	0	1	2	3	4	5	6
Distance (m)	0	50	100	100	100	160	220

Draw a graph for above details

(ii) Find the speed of travel in the first two hours from the start.

(iii) Find the speed traveled from the 4th hours to the 6th hour.

do the exercise 22.2 on page 50 of grade 10 Mathematics book ii

$$\text{The rate of volume change} = \frac{\text{Changed volume}}{\text{Time taken}}$$

Example-

(i). When a faucet in a 600l capacity tank is opened, the tank is completely empty in 5 minutes , Calculate the rate of volume of the water leaving the faucet

$$\begin{aligned} \text{The rate of volume} &= \frac{\text{changed volume}}{\text{Time taken}} = \frac{600l}{5 \times 60 s} = \frac{600}{300} \\ &= 2 \text{ ls}^{-1} \end{aligned}$$

(ii). Water flows from a pipe to a water tank at a speed of 6 ls⁻¹. The tank has two exhaust pipes. One with a uniform flow rate of 1.5 ls⁻¹ and the other with a uniform flow rate 2.5 ls⁻¹. The water tank is a solid type and its length width and height are 2m, 1m, and 1.5m respectively. If all three pipes were opened at the same time when there was 600l of water in the tank, find the time it would take to fill the tank completely.

$$\text{capacity of the tank} = 2m \times 1m \times 1.5m = 3m^3 = 3 \times 1000 = 3000l$$

$$\text{The volume to fill the tank} = 3000 - 600 = 2400l$$

$$\text{The rate at which water flows} = 6 \text{ ls}^{-1}$$

$$\text{The rate at which water exits} = 1.5 + 2.5 = 4 \text{ ls}^{-1}$$

$$\text{The rate at which water fill} = 6 - 4 = 2 \text{ ls}^{-1}$$

$$\text{Time taken to fill 2400l at a speed of 2ls}^{-1} = \frac{2400}{2} = 1200s \quad \frac{1200}{60} = 20 \text{ minute}$$

Exercise 22.3 on the page 53 of Grade Mathematic book II