

# Rate and Ratio

1. Andrew finished typing 8 similar sets of notes in 3 hours. If his typing speed increased to 60 words per minute, he would have finished typing the same sets of notes 2 hours faster.
- (a) What was Andrew's original typing speed?
- (b) If he wanted to finish 10 such sets of notes in 2.5 hours, how fast would he have to type per minute?

Answers: (a) \_\_\_\_\_

(b) \_\_\_\_\_

2. The breadth of a rectangular tank was  $\frac{1}{4}$  its length. The ratio of the length to its height was 7 : 3. When the tank was  $\frac{1}{4}$  full, the height of the water level was 9 cm.
- (a) Find the capacity of the tank.
- (b) How long does it take for a tap that flows at 7 litres per minute to fill up the tank completely?
- (Round off your answer to the nearest minute)

Answers: (a) \_\_\_\_\_

(b) \_\_\_\_\_

# Solution to Rate and Ratio

1.

Step 1 : Find the total number of words in 8 similar sets of notes

$$3 \text{ hours} - 2 \text{ hours} = 1 \text{ hour}$$

$$1 \text{ hour} = 60 \text{ minutes}$$

$$60 \text{ words} \times 60 \text{ minutes} = 3600 \text{ words}$$

Step 2 : Find Andrew's original typing speed

$$3 \text{ hours} = 180 \text{ minutes}$$

$$3600 \div 180 = 20$$

(a) Andrew's original typing speed was 20 words per minute.

Step 3 : Find the total number of words for 10 sets of notes

$$8 \text{ sets of notes} \rightarrow 3600 \text{ words}$$

$$1 \text{ set of notes} \rightarrow 3600 \div 8 \\ = 450 \text{ words}$$

$$10 \text{ sets of notes} \rightarrow 10 \times 450 \\ = 4500 \text{ words}$$

Step 4 : Find how fast Andrew had to type per minute

$$3 \text{ hours} = 180 \text{ minutes} \\ 2.5 \text{ hours} = 120 + 30 \\ = 150 \text{ minutes}$$

$$4500 \text{ words} \div 150 \text{ minutes} = 30 \text{ words/minutes}$$

(b) He would have to type 30 words per minute if he wanted to finish 10 sets of notes in 2.5 hours.

Answers: (a) 20 words per minute

(b) 30 words per minute

2.

Step 1 : Find the height of the tank

$$\frac{1}{4} \text{ full} \rightarrow 9 \text{ cm}$$

$$\frac{4}{4} \text{ full} \rightarrow 4 \times 9 \text{ cm} = 36 \text{ cm}$$

Step 2 : Find the length and breadth of the tank

$$\begin{array}{l} \text{length} : \text{ height} \\ 7 : 3 \end{array}$$

$$3 \text{ units} \rightarrow 36 \text{ cm}$$

$$1 \text{ unit} \rightarrow 36 \text{ cm} \div 3 = 12 \text{ cm}$$

$$7 \text{ units} \rightarrow 7 \times 12 \text{ cm} = 84 \text{ cm}$$

$$\text{Length} \rightarrow 84 \text{ cm}$$

$$\text{Breadth} \rightarrow \frac{1}{4} \times \frac{84}{1} = 21 \text{ cm}$$

Step 3 : Find the capacity of the tank

$$84 \text{ cm} \times 21 \text{ cm} \times 36 \text{ cm} = 63\,504 \text{ cm}^3$$

(a) The capacity of the tank was 63 504 cm<sup>3</sup>.

Step 4 : Find the time for the tap to fill up the tank

$$1 \text{ litre} = 1000 \text{ cm}^3$$

$$63\,504 \text{ cm}^3 = 63.504 \text{ litres}$$

$$\frac{63.504}{7} = 9.072 \text{ minutes} \approx 9 \text{ minutes}$$

(b) The tap will take about 9 minutes to fill up the tank completely.

Answers: (a) 63 504 cm<sup>3</sup>

(b) 9 minutes

Adapted:

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