

Races

1. In 1 Km race, A beats B by 36m in 18s. Find the A's time over the course.

Sol: Clearly, B covers 36m in 18sec

$$\therefore B's \text{ time over the course} = \frac{18}{36} \times 1000 \\ = 500 \text{ sec}$$

$$\therefore A's \text{ time over the course} = (500 - 18) \\ = 482 \text{ sec}$$

2. P, Q and R are three contestants in a 2km race. If P can give Q a starting 100m and P can give R a start of 138m, then how many metres start can give to R?

Sol:

When P covers 2000m, then Q covers $(2000 - 100) = 1900\text{m}$ and R covers $(2000 - 138) = 1862\text{m}$.

When Q covers 1900m, then R covers 1862m.

When Q covers 2000m, then R covers $\left[\frac{1862}{1900} \times 2000 \right] = 1960\text{m}$.

3. In a race of 1200m, A can beat B by 120m, and in a race of 500m, B can beat C by 100m. By how many metres will A beat C in a race of 800m?

Sol:

If A runs 1200m, then B runs 1080m.

If A runs 800m, then B runs,

$$\left[\frac{1080}{1200} \times 800 \right] = 720 \text{ m.}$$

When B runs 500m, then C runs 400m.

When B runs 720m, then C runs

$$\left[\frac{400}{500} \times 720 \right] = 576 \text{ m.}$$

$\therefore$ A beats C by $(800 - 576) \text{ m} = 224 \text{ m.}$

Chain rule

Direct Proportion:

$\Rightarrow$ If No. of ^{items} increase then cost of the item is also increases.

$\Rightarrow$ If the number of items decrease then cost of the item also decreases.

Indirect proportion:

$\Rightarrow$ If the speed of the car is increases then the time taken to reach the place decreases.

Problems:

- ① If 10 toys cost Rs. 250. What do 20 toys cost?

Sol:

$$10 \Rightarrow ₹ 250$$

$$20 \text{ toys} \Rightarrow x$$

$$10 \times x = 250 \times 20$$

$$x = 500.$$

$\therefore$ The cost of 20 toys is ₹ 500.

10 men can build a wall of 140m long in 42 days. In how many days can 30 men complete a similar wall of 100m long?

Sol:

10 men $\rightarrow$ 140m $\rightarrow$ 42 days

30 men $\rightarrow$ 100m $\rightarrow$?

Multiply all of the above terms & cancel out.

$$10 \times 42 \times 100 = 30 \times x \times 140$$

$$x = 10$$

$$x = 10$$

$\therefore$ It takes 10 days to complete the wall.

If the wages of 6 men for 15 days be Rs. 2100. Find the wages of 9 men for 12 days?

Sol:

6 men $\rightarrow$ 15 days $\rightarrow$ 2100

9 men $\rightarrow$ 12 days $\rightarrow$?

$$6 \times 15 \times x = 9 \times 12 \times 2100$$

$$x = 2520$$

④ 4 mat weavers can weave 4 mats
in 4 days. At the same rate,
how many mats would be woven
by 8 mat-weavers in 8 days?

sol:

Let the required number of
mats be x .

$$4 \times 4 \times x = 8 \times 8 \times 4$$

$$x = \frac{8 \times 8 \times 4}{4 \times 4}$$

$$\boxed{x = 16}$$

$$\boxed{16 = x}$$