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Q6→ A water tank has two fifth full. pipe A can fill a tank in 10 minutes and pipe B empty it in 6 minutes. If both are open, the pipes how long will it take to empty or fill the tank completely.

Sol.→ Outlet pipe is faster than inlet pipe so tank will be emptied.

Part to be emptied $\frac{2}{5}$

Net part emptied in 1 minute $= \frac{1}{y} - \frac{1}{x}$

$= \frac{1}{6} - \frac{1}{10}$

$= \frac{5-3}{30} = \frac{2}{30} = \frac{1}{15}$

$\Rightarrow \frac{1}{15} : \frac{2}{5} :: 1 : x$

$\Rightarrow \frac{x}{15} \times \frac{2}{5}$

$\Rightarrow 5x = 30$

$\Rightarrow x = \frac{30}{5} = 6.$

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so, the tank will be emptied in 6 minutes.

Q 4 → Two pipes can fill a cistern in 14 hours and 16 hours respectively. The pipes are opened simultaneously and it is found that due to leakage at bottom it took 32 minutes more to fill the cistern, when the cistern is full, in what time will the ~~leakage~~ leak empty it?

Ans → Work done by two pipes in 1 hour = $\frac{1}{14} + \frac{1}{16}$

$= \frac{8+7}{112}$

$= \frac{15}{112}$.

∴ Time taken by the pipes to fill the tank

$= \frac{112}{15}$ hrs.

= 7 hrs 28 min.

Total time taken to fill the tank = 7 hrs 28 min

+32

= 8 hrs.

∴ Work done by (two pipes + leakage) = $\frac{1}{8}$ hrs.

→ The tank will empty due to leakage in 1 hr.

$= \left(\frac{15}{112} - \frac{1}{8}\right)$

$= \frac{15-14}{112} = \frac{1}{112}$

Total time taken to empty the tank due to leakage = 112 hours.

if he will go with bike both the sides.

An aeroplane flies along the four sides of a square at a speed of 200, 400, 600 and 800 km/hr. Find the average speed of the aeroplane around the field?

Let the average speed of the aeroplane = y.
Let the sides of the four be x.

Then, $\frac{x}{200} + \frac{x}{400} + \frac{x}{600} + \frac{x}{800} = \frac{4x}{y}$

$\Rightarrow \frac{12x + 6x + 4x + 3x}{2400} = \frac{4x}{y}$

$\Rightarrow \frac{25x}{2400} = \frac{4x}{96y}$

$\Rightarrow y = \frac{2400 \times 4x}{25x}$

$= 96 \times 4$

$= 384$.

∴ Average speed = 384 km/hr.

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$\Rightarrow \left(\frac{6 \times 5}{18}\right)$ m/s

$\Rightarrow \frac{5}{3}$ m/s

$\Rightarrow 1\frac{2}{3}$ m/s. Ans.

Assignment - 5

While covering a distance of 24 km, a man noticed that after walking for 1 hour and 40 minutes, the distance covered by him was $\frac{5}{7}$ km of the remaining distance. What was the speed in metres per second?

Let the speed be x km/hr.

Distance covered by him in 1 hour 40 minutes $= 1\frac{2}{3}$ hr $\times x$ km/hr

$= \frac{5}{3} x$ km/hr.

Remaining Distance $= \left(24 - \frac{5x}{3}\right)$

$$\frac{5x}{3} = \frac{5}{7}\left(24 - \frac{5x}{3}\right)$$

$$\frac{5x}{3} = \frac{5}{7} \times \left(\frac{72 - 5x}{3}\right)$$

$$\frac{5x}{3} = \frac{360 - 25x}{21}$$

$21 \times 5x = 360 \times 3 - 25x$

$\Rightarrow 7x = 72 - 5x$.

$\Rightarrow 12x = 72$

$\Rightarrow x = \frac{72}{12} = 6$. Speed $= 6$ km/hr.

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