

2. Victoria can finish typing an essay in five hours while Jenny can type the same essay in eight hours. How long will it take them to type the essay if they work together?

Solution

one unknown only \rightarrow time required to type the essay if the two girls work together

Let t represent this time (in hours)

Time (h)	Fraction of essay done by V	Fraction done by J	Together
1	$\frac{1}{5}$	$\frac{1}{8}$	$\frac{1}{5} + \frac{1}{8} = \frac{13}{40}$
t	$\frac{t}{5} = \frac{1}{5}t$	$\frac{t}{8} = \frac{1}{8}t$	$\frac{13}{40}t$

$$\text{fraction of essay done when completed} = \frac{40}{40} = 1$$

$$\frac{13}{40}t = 1$$

$$\frac{40}{13} \left(\frac{13}{40}t \right) = \frac{40}{13} (1)$$

$$t = \frac{40}{13} \text{ hours}$$

$$\therefore t = 3\frac{1}{13} \text{ hours}$$

$$= 3 \text{ hours} + \frac{1}{13} \text{ hour}$$

$$= 3 \text{ h} + \frac{1}{13} \text{ h} (60 \text{ min/h})$$

$$= 3 \text{ h}, 5 \text{ minutes}$$

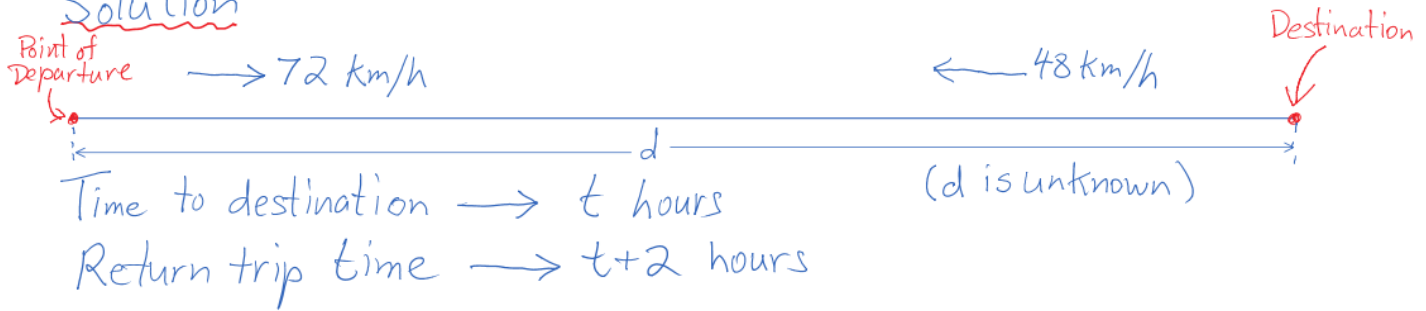
$$\frac{40}{13} \doteq 3.08 \text{ h}$$

$$8 \text{ min} = \frac{8}{60} \text{ h}$$

$$\doteq 3 \text{ h} + \frac{8}{100} \text{ h}$$

1. A train travelling nonstop to its destination makes the trip at an average speed of 72 km/h. On the return trip, the train makes several stops and is only able to average 48 km/h. If the return trip takes two hours longer than the initial trip to the destination, then what is the travel time each way?

Solution



$$\left. \begin{aligned} V &= \frac{d}{t} \frac{\text{km}}{\text{h}} \\ \therefore d &= vt \end{aligned} \right\} \begin{aligned} d &= 72t \quad (\text{to destination}) \\ d &= 48(t+2) \quad (\text{return trip}) \end{aligned}$$

Since the return trip distance equals the distance to the destination,

$$\therefore 72t = 48(t+2)$$

$$\therefore 72t = 48t + 96$$

$$\therefore 24t = 96$$

$$\therefore t = \frac{96}{24} = 4 \quad (\text{initial trip to destination})$$

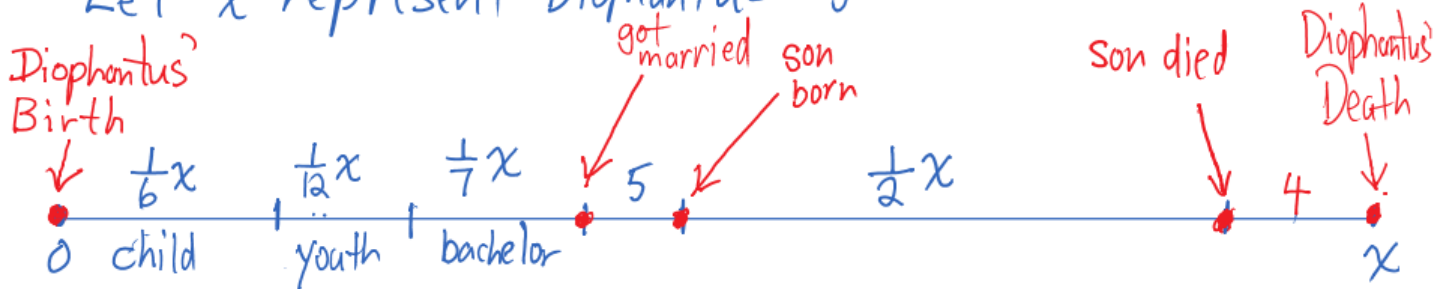
$$\therefore t+2 = 4+2 = 6 \quad (\text{return trip})$$

The initial trip to the destination took 4 h and the return trip took 6 h.

2. Diophantus of Alexandria was a Greek mathematician who lived between 200 AD and 300 AD. He was a child for one-sixth of his life, a youth for one-twelfth of his life and a bachelor for one-seventh more. Five years after he married, his son was born. Diophantus' son died four years before his father at half his father's final age. How old was Diophantus when he died?

Solution

Let x represent Diophantus' age at the time he died



$$\frac{1}{6}x + \frac{1}{12}x + \frac{1}{7}x + 5 + \frac{1}{2}x + 4 = x$$

3. Basmati rice costs \$4.50/kg while wild rice costs \$5.40/kg. In what ratio should the basmati rice be mixed with wild rice to create a blend that costs \$5.00/kg?

Solution

	Fraction of Mixture	Cost of Fraction
Basmati	$1-v$	$4.5(1-v)$
Wild	v	$5.4v$
Total	1	$5(1) = 5$

1 kg altogether

Wild v
Basmati $1-v$

$$\text{Cost of Basmati} + \text{Cost of Wild} = \text{Total Cost}$$

$$4.5(1-v) + 5.4v = 5$$