

#17] Phyllis invested \$12,000, part at 4.5% interest, other at 4%. After one year she gets \$525.

$x =$ money invested at 4.5%

$\Rightarrow 12,000 - x =$ money invested at 4%

$$\Rightarrow 0.045 \cdot x + 0.04(12,000 - x) = 525$$

$$\Rightarrow 0.045x + 0.04 \cdot 12,000 - 0.04x = 525$$

$$\Rightarrow 0.005x = 525 - 480 = 45$$

$$\Rightarrow x = \frac{45}{0.005} = 9,000$$

\Rightarrow \$9,000 at 4.5% and \$3,000 at 4%

20] Jack invests \$1,000 at a certain rate and \$2,000 at a rate $\frac{1}{2}\%$ higher. Total interest is \$190. What's the rates?

$x =$ rate for \$1,000.

$\Rightarrow x + 0.5 =$ rate for \$2,000

$$\Rightarrow 1,000x + 2,000(x + 0.005) = 190$$

$$\Rightarrow 3000x + 2000 \cdot 0.005 = 190$$

$$\Rightarrow 3000x = 190 - 10 = 180$$

$$\Rightarrow x = \frac{180}{3000} = 0.06$$

\Rightarrow 6% for \$1,000 and 6.5% for \$2,000

#27) Movie stars "seven years ago I was 11 times as old as my daughter. Now I am 4 times as old as she is."

x = age of movie star now

y = age of daughter now

$\Rightarrow x - 7$ is age 7 years ago

$\Rightarrow y - 7$ is daughter's age 7 years ago.

$$\Rightarrow \begin{aligned} x - 7 &= 11(y - 7) \\ x &= 4y \quad (\text{can subst. } 4y \text{ for } x) \end{aligned}$$

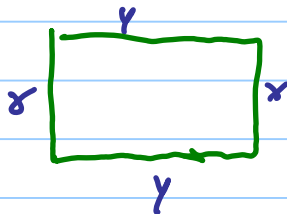
$$\Rightarrow 4y - 7 = 11y - 77$$

$$70 = 7y \Rightarrow y = 10$$

daughter is 10 years, movie star is 40 years

#46) A farmer has a rect. garden surrounded by 200 feet of fence. Area of garden is 2400 ft²

let x = width, y = length



$$\Rightarrow 2x + 2y = 200 \text{ and } xy = 2400$$

$$\Rightarrow x + y = 100 \text{ or } y = 100 - x$$

Subst $y = 100 - x$ into other equation:

$$x(100 - x) = 2400 \text{ or}$$

$$-x^2 + 100x - 2400 = 0 \text{ or}$$

$$x^2 - 100x + 2400 = 0$$

$$\Rightarrow (x - 40)(x - 60) = 0$$

So x could be 40 $\Rightarrow y = 60$ or

x could be 60 $\Rightarrow y = 40$

#59) Candy and Tim deliver papers. Candy can do it in 70 min, Tim in 80. How long together?

They are about equally fast so together they should take about $\frac{1}{2}$ time of working alone. Thus, answer should be $\approx 35-40$ min.

Candy does 1 route per 70 min $\Rightarrow \frac{1}{70}$

Tim does 1 route per 80 min $\Rightarrow \frac{1}{80}$

Together they do 1 route per t min

$$\Rightarrow \frac{1}{70} + \frac{1}{80} = \frac{1}{t}$$

$$\Rightarrow \frac{80 + 70}{5600} = \frac{1}{t} \Rightarrow \frac{15}{560} = \frac{1}{t}$$

$$\Rightarrow t = \frac{560}{15} = 37.3 \text{ min}$$

\Rightarrow Together they take 37.3 minutes

#60) Skem, Hilda mow 1 lawn in 60 min together

Hilda works twice as fast as Skem. How

long each?

If they were equally fast and work 60 min

together, each would take 80 min. Thus,

Hilda should take less than 80, Skem more.

t = time for Stem

$\Rightarrow \frac{1}{2}t$ = time for Hilda

Stem: 1 lawn per t min

Hilda: 1 lawn per $\frac{1}{2}t$ min

Together: 1 lawn per 40 min

$$\Rightarrow \frac{1}{t} + \frac{1}{\frac{1}{2}t} = \frac{1}{40}$$

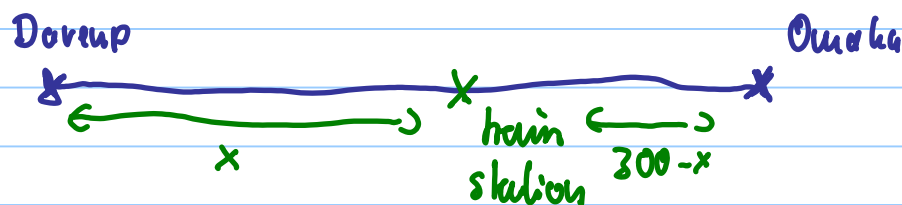
$$\Rightarrow \frac{1}{t} + \frac{2}{t} = \frac{1}{40} \Rightarrow \frac{3}{t} = \frac{1}{40} \Rightarrow t = 120$$

\Rightarrow Stem takes 120 min, Hilda 60 min.

#65) Wendy goes from Davenport to Omaha (300 miles)

Part by bus (40 mph), other part by train

(60 mph). Trip took $5\frac{1}{2}$ h.



x miles on bus at 40 mph

$300 - x$ miles on train at 60 mph

$$\frac{\text{dist}}{\text{time}} = \text{speed} \quad \text{or} \quad \frac{\text{dist}}{\text{speed}} = \text{time}$$

\Rightarrow time on bus is $\frac{x}{40}$

time on train is $\frac{300-x}{60}$

$$\text{Total time } \frac{x}{40} + \frac{300-x}{60} = 5.5$$

$$\Rightarrow 60x + 40(300-x) = 5.5 \cdot 2400$$

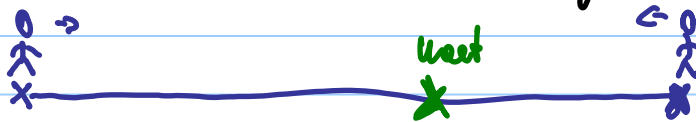
$$20x = 13200 - 12000$$

$$x = 60$$

\Rightarrow Wendy travels 60 miles per bus and
240 miles per train

#66) 2 cyclists, 90 miles apart, ride to meet.

One rides twice as fast as other. They meet
in 2h. What speed are they traveling?



One rides 2 \times as fast as other, so she must
cover twice the distance as first one. They
are 90 miles apart so one travels 60 miles
other 30 miles.

Each travels for 2 hours, so:

slower rides 30 miles in 2 hours \Rightarrow 15 mph

faster rides 60 miles in 2 hours \Rightarrow 30 mph.

Thus: slower speed is 15 mph

faster speed is 30 mph