

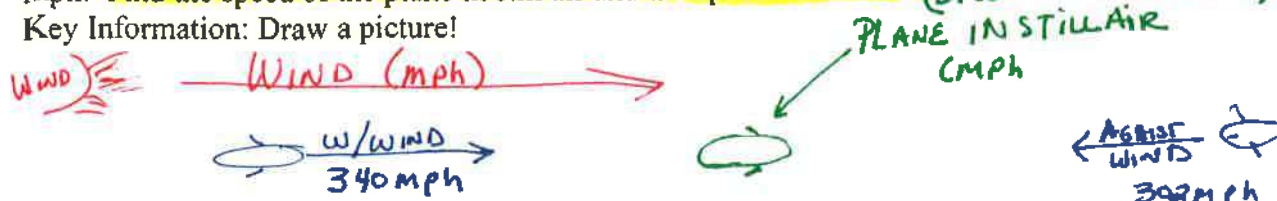
7WP - Current Word Problems with Systems

Date

Period

- 1) Flying with the wind a plane went 340 mph. Flying into the same wind the plane only went 302 mph. Find the speed of the plane in still air and the speed of the wind (SPEED OF THE PLANE)

Key Information: Draw a picture!

Variables: $X =$ Plane's speed (mph) in still air $Y =$ Wind Speed (mph)

Equations: 1) $X + Y = 340$ $\downarrow +$
 2) $X - Y = 302$ $\downarrow +$

Solve and Check:

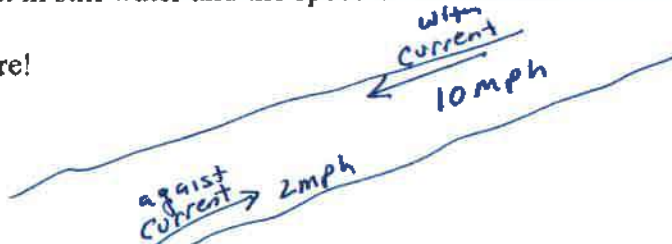
$$\begin{array}{r} 2X = 642 \\ \hline X = 321 \end{array}$$

$$\begin{array}{r} 321 + Y = 340 \\ \hline Y = 19 \end{array}$$

Answer (in words) Plane - 321 mph Wind - 19 mph

- 2) Traveling with the current a certain boat went 10 mph. Against the same current it only went 2 mph. Find the speed of the boat in still water and the speed of the current.

Key Information: Draw a picture!

Variables: $X =$ Speed in still water (mph) $Y =$ Current speed (mph)

Equations: 1) $X + Y = 10$ $\downarrow +$
 2) $X - Y = 2$ $\downarrow +$

Solve and Check:

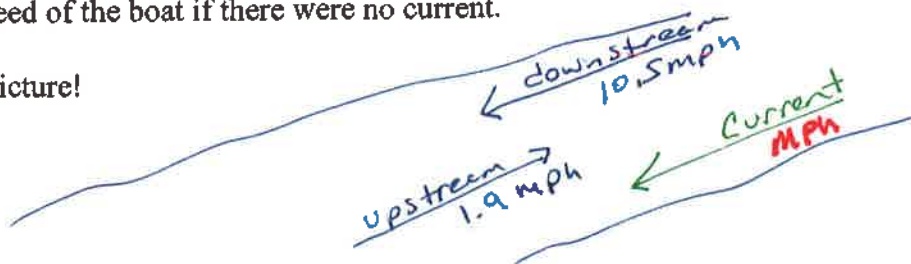
$$\begin{array}{r} 2X = 12 \\ \hline X = 6 \end{array}$$

$$\begin{array}{r} Y = 4 \end{array}$$

Answer (in words) 6 mph in still water; current speed is 4 mph

- 3) Traveling downstream a certain boat went 10.5 mph. Traveling upstream it only went 1.9 mph. Find the current and the speed of the boat if there were no current.

Key Information: Draw a picture!



Variables: $X =$ Speed in still water (mph) $Y =$ speed of Current (mph)

Equations: 1) $X + Y = 10.5$
2) $X - Y = 1.9$

Solve and Check:

$$\frac{2x}{2} = \frac{12.4}{2}$$

FIND Y

$$\begin{array}{r} 6.2 \\ -6.2 \\ \hline y = 4.3 \end{array}$$

Answer (in words) Speed in still water is 6.2 mph; Current speed 4.3 mph

- 4) A plane traveled 600 miles to San Francisco and back. The trip there was with the wind. It took 5 hours. The trip back was into the wind. The trip back took 10 hours. What is the speed of the plane in still air? What is the speed of the wind?

Key Information: Draw a picture!

DISTANCE Formula:
 $D = R \cdot T$ $d = \text{distance (m)}$
 $r = \text{rate (cmph)}$
 $t = \text{time (h)}$

Distance is 600 miles → SANFRAN
Trip w/wind is 5hrs → wind
← Trip against the wind is 10 hrs against wind

Variables: $X =$ Speed of plane in still air (mph) $Y =$ Speed of Wind (mph)

Equations: 1) Trip w/wind : $5x + 5y = 600$
2) Trip against wind: $10x - 10y = 600$

Solve and Check:

Solve

$$\begin{array}{rcl} (5x + 5y = 600) \times 2 & \rightarrow & 10x + 10y = 1200 \quad \downarrow + \\ 10x - 10y = 600 & \rightarrow & 10x - 10y = 600 \quad \downarrow - \\ \hline & & 20y = 1800 \\ & & \frac{20}{20} \quad \frac{1800}{20} \\ & & \boxed{y = 90} \end{array}$$

FIND Y

$$\begin{array}{r} 5(90) + 5Y = 600 \\ 450 + 5Y = 600 \\ -450 \quad -450 \\ \hline 5Y = 150 \\ \underline{5} \quad \underline{5} \\ Y = 30 \end{array}$$

Answer (in words)

→ The speed of the plane in still air is 90 mph and the speed of the wind is 30 mph.