

The speed of a kayaker is 5.75 mi/h paddling with the river current and 3.25 mi/h paddling against it. What is the speed of the river current?

$$x = \text{speed of river current} = 1.25 \text{ mi/h}$$

$$y = \text{speed of the kayaker} = 4.5 \text{ mi/h}$$

Kayaker + current

$$y + x = 5.75$$

kayaker - current

$$y - x = 3.25$$

$$\begin{array}{r} 4.5 + x = 5.75 \\ -4.5 \quad -4.5 \\ \hline x = 1.25 \end{array}$$

$$y + x = 5.75$$

$$y - x = 3.25$$

$$\frac{2y}{2} = \frac{9}{2}$$

$$y = 4.5$$

$$1.25 \text{ mi/h}$$

A traveler is walking on a moving walkway in an airport. The traveler must walk back to get a bag he forgot. The traveler's ground speed is 2 ft/s against the walkway and 6 ft/s with the walkway. What is the traveler's speed off the walkway? What is the speed of the moving walkway?

$$x = \text{traveler's speed} = 4 \text{ ft/s}$$

$$y = \text{moving walkway's speed} = 2 \text{ ft/s}$$

$$x + y = 6$$

$$x - y = 2$$

$$x + y = 6$$

$$4 + y = 6$$

$$y = 2$$

$$\frac{2x}{2} = \frac{8}{2}$$

$$x = 4$$

You have two vinegars. One is 5% acetic acid, and one is 6.5% acetic acid. You want to make 200 mL of a vinegar with 6% acetic acid. How many mL of each vinegar do you need?

$$x = \text{mL of 5\% acid}$$

$$y = \text{mL of 6.5\% acid}$$

5%	6.5%	6.0%
x	y	$= 200$
$0.05x$	$+ 0.065y$	$= 0.06(200)$

$$\text{mL: } x + y = 200 \text{ mL}$$

$$\text{acid: } \overset{5x}{0.05x} + \overset{6.5y}{0.065y} = \overset{6(200)}{0.06(200)}$$

$$\begin{array}{r} x + y = 200 \\ -y \quad -y \\ \hline x = 200 - y \end{array}$$

$$x = 200 - 133\frac{1}{3}$$

$$x = 66\frac{2}{3}$$

$$\begin{array}{r} 0.05(200 - y) + 0.065y = 12 \\ 10 - 0.05y + 0.065y = 12 \end{array}$$

$$\begin{array}{r} 10 + 0.015y = 12 \\ -10 \quad -10 \\ \hline 0.015y = 2 \end{array}$$

$$\frac{0.015y}{0.015} = \frac{2}{0.015}$$

$$y = 133\frac{1}{3} \text{ mL}$$