

Word Problem Examples

Calvin mixes candy that sells for \$2.00 per pound with candy that costs \$3.60 per pound to make 50 pounds of candy selling for \$2.16 per pound. How many pounds of each kind of candy did he use in the mix?

$x = \# \text{ lbs of } \$2.00 \text{ candy}$

$y = \# \text{ lbs of } \$3.60 \text{ candy}$

$$x + y = 50$$

$$2x + 3.6y = 50(2.16)$$

$$\Rightarrow x + y = 50$$

$$20x + 36y = 1080$$

$$-20x - 20y = -1000$$

$$20x + 36y = 1080$$

$$16y = 80$$

$$y = 5$$

$$x = 45$$

He mixes 45 lbs of \$2.00 candy and 5 lbs of \$3.60 candy

A solution of pure antifreeze is mixed with water to make a 65% antifreeze solution. How much of each should be used to make 70 L?

	Amount	Part	Final
Antifreeze	a	1	
Water	w	0	
Final	70	0.65	

We use a and w for our variables. Antifreeze is pure, 100% or 1 in our table, written as a decimal. Water has no antifreeze, its percentage is 0. We also fill in the final percent

	Amount	Part	Final
Antifreeze	a	1	a
Water	w	0	0
Final	70	0.65	45.5

Multiply to find final amounts

$$a + w = 70$$

$$a = 45.5$$

$$(45.5) + w = 70$$

$$-45.5 \quad -45.5$$

$$w = 24.5$$

45.5 L of antifreeze and 24.5 L of water

First equation comes from first column

Second equation comes from second column

We have a , plug into to other equation

Subtract 45.5 from both sides

We have our w

Our Solution

It takes 2 hours for a small plane to travel 390 miles with the wind. Going against the wind, the plane can travel 330 miles in the same amount of time. Find the speed of the plane in still air and the speed of the wind.

	Rate	Time	Distance
with wind	$(P+W)$	2	390
against wind	$(P-W)$	2	330

the speed of the plane is 180 mph
the speed of the wind is 15 mph

$$\begin{cases} (P+W)2 = 390 \\ (P-W)2 = 330 \end{cases} \Rightarrow \begin{cases} 2P+2W=390 \\ 2P-2W=330 \end{cases}$$

$$(180+W)2 = 390$$

$$360 + 2W = 390$$

$$-360 \quad -360$$

$$2W = 30$$

$$W = 15$$

$$\frac{4P}{4} = \frac{720}{4}$$

$$P = 180$$

BUSINESS AND FINANCE Otis has a total of \$12,000 invested in two accounts. One account pays 8% and the other 9%. If his interest for 1 year is \$1,010, how much does he have invested at each rate?

$\rightarrow X = \text{Amount Invested at } 8\%$
 $\rightarrow y = \text{amount invested at } 9\%$

equation based on the amount invested: $X + y = 12000$

equation based on the interest earned: $(.08X + .09y = 1010)$

$$8X + 9y = 101,000$$