

Math 80 Worksheet #2 Solutions

1. How many liters of a 60% alcohol solution must be added to 15 liters of a 10% alcohol solution to get 20% alcohol solution?

Unknowns: Liters of 60% alcohol solution = x

Organizing the data:

Amount of Mixture	Concentration	Amount of Pure Alcohol
x	60%	$.6x$
15 L	10%	$.1(15) = 1.5$ L
$x + 15$	20%	$.2(x + 15)$

Looking at the amounts of pure alcohol in each mixture: $.6x + 1.5 = .2(x + 15)$
(Since we are mixing the 60% and 10% mixtures to get the 20% mixture.)

Solving this equation, we have $.6x + 1.5 = .2x + 3 \Rightarrow .4x = 1.5 \Rightarrow x = 3.75$

So, we need 3.75 liters of the 60% alcohol solution.

2. Bob invested \$1000 at some rate and invested \$3000 at double the first rate. He made \$210 in interest that year. What were the annual rates of each investment?

Unknowns: Rate #1 = r , Rate #2 = $2r$

Organizing the data:

Amount Invested	Interest Rate	Interest
\$1000	r	$1000r$
\$3000	$2r$	$3000(2r) = 6000r$

Since Bob made a total of \$210, we have $1000r + 6000r = 210 \Rightarrow 7000r = 210$
 $\Rightarrow r = .03$

Bob invested \$1000 at a rate of 3% and \$3000 at a rate of 6%.

3. At precisely the same instant, two cars leave towns that are 400 miles apart and travel towards each other on a straight highway. They meet after 4 hours. Find the speed of each car if one travels 20 mph slower than the other.

Unknowns: Speed of car 1 = s Speed of car 2 = $s - 20$ (in mph)

Note: You will arrive at the same solution if you choose to express one speed as s and the other as $s + 20$.

Organizing the data:

Speed	Time	Distance Travelled
s	4 hours	$4s$
$s - 20$	4 hours	$4(s - 20)$

Since the cars meet after 4 hours and they were 400 miles apart initially, the two cars have a combined mileage of 400 miles. $\Rightarrow 4s + 4(s - 20) = 400$

$$\Rightarrow 8s - 80 = 400$$

$$\Rightarrow 8s = 480 \Rightarrow s = 60$$

One car travels at 60 mph and the other travels at 40 mph.

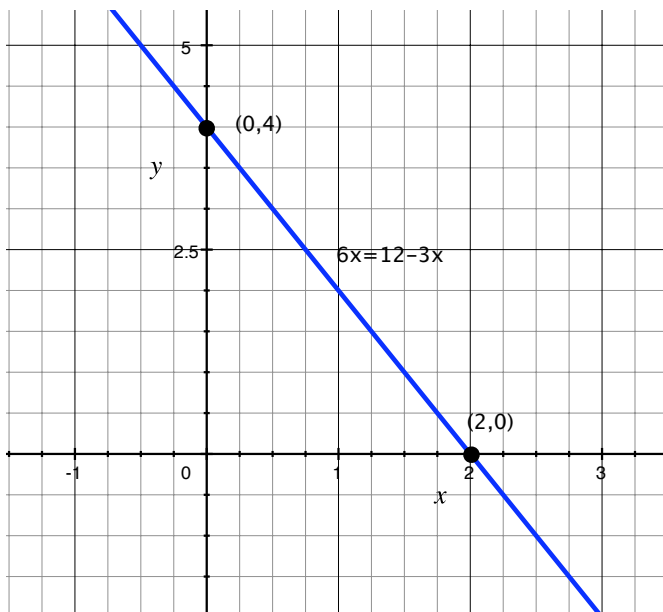
4. Complete the ordered pair $(1, \quad)$ for the equation $6x = 12 - 3y$.

Plugging in $x = 1$, we have $6(1) = 12 - 3y \Rightarrow -6 = -3y \Rightarrow 2 = y$. So $(1, 2)$ is a solution to the equation $6x = 12 - 3y$.

5. Graph $6x = 12 - 3y$. What are the intercepts for this equation?

x -intercept: Set $y = 0 \Rightarrow 6x = 12 \Rightarrow x = 2$. The x -intercept is $(2, 0)$.

y -intercept: Set $x = 0 \Rightarrow 0 = 12 - 3y \Rightarrow 3y = 12 \Rightarrow y = 4$. The y -intercept is $(0, 4)$.



6. Graph the linear equations $x = 5$ and $y = -2$.

