

Math 99 Worksheet #2 Solutions

1. Is $(4, 5, 3)$ a solution to the system $2x - 3y + 2z = 1$?
- $$\begin{aligned}x + 2y + z &= 17 \\ 2y - z &= 7\end{aligned}$$

$(4, 5, 3)$ is a solution to the system if it satisfies each equation. Plugging the ordered triple into the left side of the first equation, we have

$$2(4) - 3(5) + 2(3) = 8 - 15 + 6 = -1 \neq 1.$$

Since the ordered triple does not satisfy the first equation, it cannot be a solution to the system.

2. A coffee shop sells regular doughnuts for \$.80 and pink-frosted doughnuts for \$1.35. On a particular day, 24 more pink-frosted doughnuts are sold than regular doughnuts and the shop had \$94.75 in total doughnut sales. How many of each type of doughnut was sold that day? Which doughnut is tastier?

Unknowns: Number of regular doughnuts = x
Number of pink-frosted doughnuts = y

Equations:

We know that 24 more pink-frosted doughnuts were sold, so we have that $y = x + 24$.

We have the following data:

	Amount sold	Price	Total Value Sold
Regular	x	\$.80	$.80x$
Pink-Frosted	y	\$1.35	$1.35y$

We had $$.80x$ in sales of regular doughnuts and $\$1.35y$ in sales of pink-frosted doughnuts. So, our second equation is $.80x + 1.35y = 94.75$ (reflecting our total sales).

We have the following system: $y = x + 24$
 $.80x + 1.35y = 94.75$

Using substitution: $.80x + 1.35(x + 24) = 94.75$
 $.80x + 1.35x + 32.4 = 94.75$
 $2.15x = 62.35$
 $x = 29$

Solving for y : $y = 29 + 24 = 53$

Solution: The coffee shop sold 29 regular doughnuts and 53 pink-frosted doughnuts.

3. Two cheetahs leave a tree at the same time. One travels north and the other, going 20 mph faster than the northbound cheetah, travels south. After 3 hours of running at a constant speed, the cheetahs are 390 miles apart. Find the speeds of the two cheetahs.

Unknowns: Speed of northbound cheetah = x
Speed of southbound cheetah = y

Equations:

We know that the southbound cheetah is going 20 mph faster than the northbound cheetah, so $y = x + 20$.

We have the following data:

	Rate	Time	Distance
Northbound Cheetah	x	3	$3x$
Southbound Cheetah	y	3	$3y$

The northbound cheetah ran $3x$ miles and the southbound cheetah ran $3y$ miles. So, our second equation is $3x + 3y = 390$ (total distance between the cheetahs by the third hour).

We have the following system: $y = x + 20$
 $3x + 3y = 390$

Using substitution: $3x + 3(x + 20) = 390$ (Could use elimination instead.)
 $3x + 3x + 60 = 390$
 $6x = 330$
 $x = 55$

Solving for y : $y = 55 + 20 = 75$

Solution: The northbound cheetah travels a constant 55 mph and the southbound cheetah travels a constant 75 mph.

4. Graph each inequality on a number line.

(a) $a \geq 5$



(b) $x < -2$



(c) $-3 < y \leq 2$

