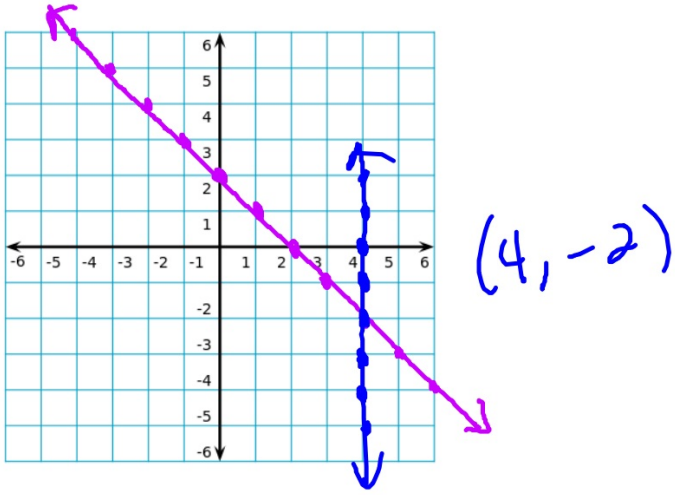
1.) $y = 2 - x$

$0 = 2x - 8$

$y = -x + 2$

$x = 4$



6.) $x + 2y = 5$

$+ \quad -x + 5y = -12$

$7y = -7$

$y = -1$

$x + 2y = 5$

$x + -2 = 5$

$x = 7$

$(7, -1)$

8.) $-18x + 2y = -4$

$-2(-9x + 4y = 19)$

$$\begin{aligned} -\cancel{18x} + 2y &= -4 \\ \cancel{18x} - 8y &= -38 \\ \hline -6y &= -42 \\ y &= 7 \end{aligned}$$

$(1, 7)$

$-9x + 4(7) = 19$

-28

$-9x = -9$

$x = 1$

4.) $3x + y = 11 \Longrightarrow y = (11 - 3x)$

$6x - 2y = 2$

$6x - 2(11 - 3x) = 2$

$6x - 22 + 6x = 2$

$12x - 22 = 2$

$12x = 24$

$x = 2$

$y = 11 - 6$

5

$(2, 5)$

9.)

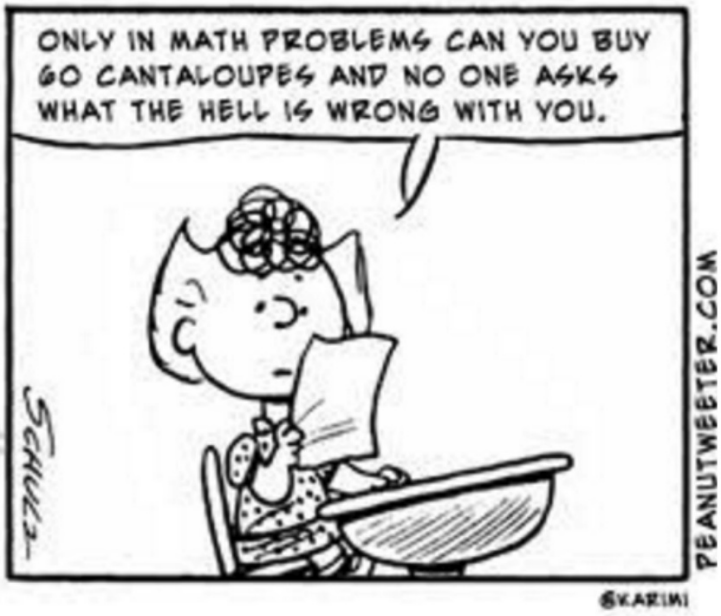
$$3x + 4y = 4$$

$$\frac{-12x}{4} - \frac{16y}{4} = \frac{12}{4}$$

$$\begin{array}{r} 3x + 4y = 4 \\ -3x - 4y = 3 \\ \hline 0 = 7 \end{array}$$

$$\emptyset$$

Algebra 2: Systems of 3 variables/word problems



Solve.

1)
$$2x + 3y + 2z = 13$$
$$2y + z = 1$$
$$z = 3$$

$2y + 3 = 1$

$y = -1$

$2x + 3(-1) + 2(3) = 13$

$2x - 3 + 6 = 13$

$x = 5$

(x, y, z)

$(5, -1, 3)$

2) $\boxed{x + z = 8}$

$-2(x + y + 2z = 17)$

$x + 2y + z = 16$

$-2x - 2y - 4z = -34$

$-x - 3z = -18$

$3 + 2y + 5 = 16$

$2y + 8 = 16$

$y = 4$

$x + z = 8$

$+ \quad -x - 3z = -18$

$-2z = -10$

$z = 5$

$x + z = 8$

$x + 5 = 8$

$x = 3$

$(3, 4, 5)$

2) $x + z = 8$

$x + y + 2z = 17$

$x + 2y + z = 16$

$8 + 2y = 16$

$2y = 8$

$y = 4$

$x + 4 + 2z = 17$

$x + 2z = 13$

$x + z = 8$

3) $2y - z = 7$

$-2(x + 2y + z = 17)$

$2x - 3y + 2z = -1$

$-2x - 4y - 2z = -34$

$+\ 2x - 3y + 2z = -1$

$-7y = -35$

$y = 5$

$2y - z = 7$

$10 - z = 7$

$z = 3$

$x + 2(5) + 3 = 17$

$x + 13 = 17$

$x = 4$

$(4, 5, 3)$

4) ① $x + y - 2z = 7$

② $(-x + 4y + 3z = 2)\,2$

③ $2x - 3y + 2z = -2$

$x + 2 + 2 = 7$

$x = 3$

Add ① and ②

$$\begin{array}{r} x + y - 2z = 7 \\ -x + 4y + 3z = 2 \\ \hline 5y + z = 9 \end{array}$$

$5y - 1 = 9$

$y = 2$

Add ② + ③

$$\begin{array}{r} -2x + 8y + 6z = 4 \\ +\ 2x - 3y + 2z = -2 \\ \hline 5y + 8z = 2 \end{array}$$

$$\begin{array}{r} -5y + {}^{-}8z = {}^{-}2 \\ 5y + z = 9 \\ \hline -7z = 7 \end{array}$$

$z = -1$

$\boxed{(3, 2, -1)}$

5)

$$2x + y + 3z = 10$$
$$-2(x - 2y + z = 10)$$
$$-4x + 3y + 2z = 5$$

$$4x - 8y + 4z = 40$$
$$-5y + 6z = 45$$

$$2x + y + 3z = 10$$
$$-2x + 4y - 2z = -20$$

$$5y + z = -10$$
$$-5y + 6z = 45$$

$$7z = 35$$
$$z = 5$$

$$5y + 5 = -10$$
$$y = -3$$

$$x - 2(-3) + 5 = 10$$
$$x + 11 = 10$$
$$x = -1$$

$$(-1, -3, 5)$$

6) $\begin{cases} -6x-2y+2z=-8 \\ 2(3x-2y-4z=8) \\ 6x-2y-6z=-18 \end{cases}$

$-4y-4z=-26$

$-6x-2y+2z=-8$

$6x-4y-8z=16$

$2(-6y-6z=8)$

$-3(-4y-4z=-26)$

$-12y-12z=16$

$12y+12z=78$

$0 \neq 84$

$\emptyset$

Set up a system of equations that models the problem. Then solve.

1) Kerry asked a bank teller to cash a $390 check using $20 bills and $50 bills. If the teller gave her a total of 15 bills, how many of each type did she receive?

x : \$20

y : \$50

$x + y = 15$

$20(x) + 50y = 390$

$x = 15 - y$

$20(15 - y) + 50y = 390$

$300 - 20y + 50y = 390$

$30y = 90$

$y = 3$

12	\$20
3	\$50

2) Three times a first number decreased by a second number is 1. The first number increased by twice the second number is 12. Find the numbers.

$$3x - y = 1$$
$$x + 2y = 12$$

3) A bowl contains 13 red and brown M&M's. There was one more red M&M's than brown M&M's. How many of each color are in the bowl?

$r + b = 13$

$1 + b + b = 13$

$b = 6$

$r = 7$

$\cancel{1 + \underset{5}{r} = \underset{6}{b}}$

$1 + b = r$

4) The sum of 3 numbers is 16. The sum of twice the first number, three times the second number, and 4 times the third number is 46. The difference between 5 times the first number and the second number is 31. Find the three numbers.

$$x + y + z = 16$$
$$2x + 3y + 4z = 46$$

$$5x - y = 31$$
$$+\ 2x + y = 18$$
$$7x = 49$$
$$x = 7$$

$$-4x + -4y - 4z = -64$$
$$+\ 2x + 3y + 4z = 46$$
$$-2x - y = -18$$
$$2x + y = 18$$
$$x = 7$$
$$y = 4$$
$$z = 5$$