

Geometry Systems of Equations Skills Review

For problems #1-2 Solve the systems of equations by substitution.

1.

$$\begin{cases} x = 5 - y \\ y - 2x = 11 \end{cases}$$

$$y - 2(5 - y) = 11$$

$$\begin{array}{r} y - 10 + 2y = 11 \\ +10 \quad \quad +10 \end{array}$$

$$\frac{3y}{3} = \frac{21}{3} \rightarrow y = 7$$

$$x = 5 - (y)$$

$$\therefore (-2, 7)$$

$$x = 5 - (7)$$

$$x = -2$$

2.

$$\begin{cases} x - 3y = -1 \\ 2x - 4y = 2 \end{cases} \rightarrow \begin{array}{r} x - 3y = -1 \\ \quad +3y \quad +3y \\ \hline x \quad \quad = -1 + 3y \end{array}$$

$$2(-1 + 3y) - 4y = 2$$

$$-2 + 6y - 4y = 2$$

$$-2 + 2y = 2$$

$$\begin{array}{r} +2 \quad \quad +2 \\ \hline 2y = 4 \end{array}$$

$$\frac{2y}{2} = \frac{4}{2} \rightarrow y = 2$$

$$\therefore (5, 2)$$

$$x - 3(y) = -1$$

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

$$\begin{array}{r} x - 6 = -1 \\ +6 \quad +6 \end{array} \rightarrow x = 5$$

For problems #3-4 solve the systems of equations by elimination.

3.

$$\begin{cases} -x + 2y = 12 \\ x + 6y = 20 \end{cases}$$

$$\begin{array}{r} -x + 2y = 12 \\ + \quad x + 6y = 20 \\ \hline 8y = 32 \end{array} \rightarrow y = 4$$

$$-x + 2(y) = 12$$

$$-x + 2(4) = 12 \quad \therefore (-4, 4)$$

$$\begin{array}{r} -x + 8 = 12 \\ -8 \quad -8 \\ \hline -x = 4 \end{array}$$

$$\frac{-x}{-1} = \frac{4}{-1} \rightarrow x = -4$$

4.

$$\begin{cases} 2x + 3y = 18 \\ 5x - y = 11 \end{cases} \rightarrow \begin{array}{r} 2x + 3y = 18 \\ 3(5x - y = 11) \rightarrow 15x - 3y = 33 \\ \hline 17x = 51 \end{array}$$

$$\frac{17x}{17} = \frac{51}{17}$$

$$x = 3$$

$$5(x) - y = 11$$

$$5(3) - y = 11$$

$$\therefore (3, 4)$$

$$\begin{array}{r} 15 - y = 11 \\ -15 \quad -15 \\ \hline -y = -4 \end{array}$$

$$\frac{-y}{-1} = \frac{-4}{-1} \rightarrow y = 4$$

Problems #5-6: choose whichever method you would like to use (substitution or elimination)

<p>5. $\begin{cases} 5x + 2y = 4 \\ x - 2y = 8 \end{cases}$</p> $\begin{array}{r} 5x + 2y = 4 \\ + \quad x - 2y = 8 \\ \hline 6x = 12 \end{array} \rightarrow x = 2$ <p>$(x) - 2y = 8$ $\therefore (2, -3)$</p> $\begin{array}{r} 2 - 2y = 8 \\ -2 \quad \quad -2 \\ \hline -2y = 6 \\ -2 \quad -2 \end{array} \rightarrow y = -3$	<p>6. $\begin{cases} 2x + 3y = 7 \\ -4x + 10y = 6 \end{cases}$</p> $\begin{array}{r} 2x + 3y = 7 \\ \rightarrow 4x + 6y = 14 \\ -4x + 10y = 6 \\ \hline 16y = 20 \\ 16 \quad 16 \end{array}$ <p>$y = \frac{5}{4}$</p> <p>$2x + 3(y) = 7$ $\therefore (\frac{13}{8}, \frac{5}{4})$</p> $\begin{array}{r} 2x + 3(\frac{5}{4}) = 7 \\ 2x + \frac{15}{4} = 7 \\ -\frac{15}{4} \quad -\frac{15}{4} \\ \hline 2x = 3\frac{1}{4} \\ \frac{2x}{2} = \frac{13}{8} \end{array}$ <p>$x = \frac{13}{8}$</p>
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For problem #7 define variables and write a system of equations and then solve algebraically to answer the question.

7. Ms. Zimmerman enjoys ^(B) Bon Appétit and ^(M) Martha Stewart magazines. She has a collection of 30 magazines total. Bon Appétit costs \$3.29 per magazine and Martha Stewart costs \$4.50 per magazine. Ms. Zimmerman has spent \$113.22 total. How many of each magazine does she own?

$$\begin{cases} B + M = 30 \\ 3.29B + 4.50M = 113.22 \end{cases} \text{ System of equations}$$

using substitution \rightarrow

$$3.29(30 - M) + 4.50M = 113.22$$

$$98.70 - 3.29M + 4.50M = 113.22$$

$$98.70 + 1.21M = 113.22$$

$$\begin{array}{r} 98.70 + 1.21M = 113.22 \\ -98.70 \quad \quad -98.70 \\ \hline 1.21M = 14.52 \\ 1.21 \quad \quad 1.21 \end{array} \quad M = 12$$

$$\begin{array}{r} B + M = 30 \\ B + 12 = 30 \\ -12 \quad -12 \\ \hline B = 18 \end{array}$$

\therefore 12 Martha Stewart
18 Bon Appétit