

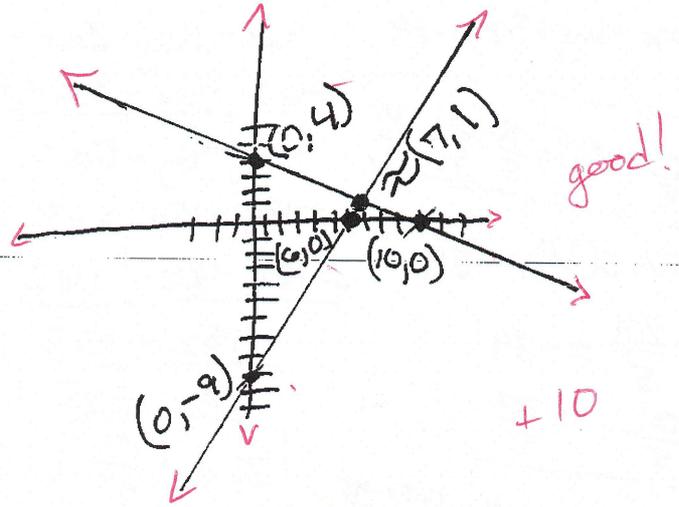
MAT 1340

69.5 / 70 good job! Paige Harmes Writing Project #4

① $2x + 5y = 20$; $3x - 2y = 18$

a) $3x - 2y = 18$ $2x + 5y = 20$

$\begin{array}{r l} x & y \\ \hline 0 & 6 \\ -9 & 0 \end{array}$	$\begin{array}{r l} x & y \\ \hline 0 & 4 \\ 10 & 0 \end{array}$
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b) $2x + 5y = 20$

$\frac{2x = 20 - 5y}{2}$ $3\left(\frac{20 - 5y}{2}\right) - 2y = 18$

$x = \frac{20 - 5y}{2}$ $\frac{(20 - 5y) \cdot 3 - 2y \cdot 2}{2} \Rightarrow \frac{(20 - 5y) \cdot 3 - 4y}{2} \Rightarrow \left(\frac{60 - 19y}{2}\right)^2 = (18)^2$

$x = \frac{20 - 5\left(\frac{24}{19}\right)}{2} \Rightarrow \frac{20 - \frac{120}{19}}{2} \Rightarrow \frac{260}{38} \Rightarrow \frac{130}{19}$

$\frac{60 - 19y = 36}{-60} \Rightarrow \frac{-19y = -24}{-19} \Rightarrow \frac{y = 24}{19}$

$x = \frac{130}{19}$ $\left(\frac{130}{19}, \frac{24}{19}\right)$ +10

c) $\begin{pmatrix} 2x + 5y = 20 \\ 3x - 2y = 18 \end{pmatrix} \cdot 3 = \begin{matrix} 6x - 4y = 36 \\ -6x + 15y = 60 \end{matrix}$

$\frac{-19y = -24}{-19} \Rightarrow y = \frac{24}{19}$

$6x + 15\frac{24}{19} = 60$

$\frac{6x = 780}{6} \Rightarrow \frac{x = 130}{19}$

$\left(\frac{130}{19}, \frac{24}{19}\right)$ +10

$x = \frac{130}{19}$

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$$\textcircled{2} (2x - 2y + z = -13) \cdot 3$$

$$6x - 6y + 3z = -39$$

$$3 \cdot 17 = \frac{51}{5} \quad \frac{30 \cdot 5}{5} = \frac{150}{5} - \frac{51}{5} = \frac{201}{5}$$

$$3x - 6(5) + 3\left(-\frac{17}{5}\right) = -39$$

$$6x - \frac{201}{5} = -39$$

$$\frac{+201}{5} \quad + \frac{201}{5}$$

$$6x = -39 + \frac{201}{5}$$

$$\frac{39 \cdot 5 = 195}{5} \quad -195 + 201 = 6$$

$$\frac{6x}{6} = \frac{6}{6}$$

$$x = \frac{1}{5}$$

$$(x, y, z) = \left(\frac{1}{5}, 5, -\frac{17}{5}\right)$$

$$(3x - 5y - z = -2) \cdot 2$$

$$6x - 10y - 2z = -4$$

$$-6x - 6y + 3z = -39$$

$$3 \cdot (-4y - 5z = -3)$$

$$-12y - 15z = -9$$

$$+12y - 30z = 162$$

$$-45z = 153$$

$$\frac{-45}{-45} \quad \frac{153}{-45}$$

$$z = -\frac{17}{5}$$

$$(x - 2z = 7) \cdot 6$$

$$6x - 12z = 42$$

$$-6x - 6y + 3z = -39$$

$$(6y - 15z = 81) \cdot 2$$

$$12y - 30z = 162$$

$$12y - 15\left(-\frac{17}{5}\right) = -9$$

$$17 \cdot 15 = \frac{255}{5} = 51$$

$$12y + 51 = -9$$

$$\frac{-51}{-51} \quad \frac{-9}{-51}$$

$$\frac{12y}{12} = \frac{-60}{12}$$

$$y = 5$$

Tip:

Some unnecessarily large multiplications going on here, could easily cause errors on more complex problems.

... Still correct sol'n though :)

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3a) $7x + 17y + 27z = 30$; $2x + 5y + 8z = 8$; $x + 2y + 3z = 6$

$-17y - 27z = -17y - 27z$

$$\frac{7x}{7} = \frac{30 - 17y - 27z}{7}$$

$$x = \frac{30 - 17y - 27z}{7}$$



$$x = \frac{30 - 17(-2z - 4) - 27z}{7}$$

$$= \frac{30 + 34z + 68 - 27z}{7}$$

$$\frac{7z + 98}{7}$$

$$\frac{7(z + 14)}{7}$$

$$x = z + 14$$

$$\frac{2(30 - 17y - 27z)}{7} + 5y + 8z = 8$$

$$\frac{2(30 - 17y - 27z)}{7} + \frac{5y \cdot 7}{7} + \frac{8z \cdot 7}{7}$$

$$\frac{2(30 - 17y - 27z) + 35y + 56z}{7}$$

$$\frac{60 - 34y - 54z + 35y + 56z}{7}$$

$$7 \cdot \left(\frac{y + 2z + 60}{7} \right) = (8) \cdot 7$$

$$\begin{array}{r} y + 2z + 60 = 56 \\ -2z \quad -60 \quad -2z \quad -60 \end{array}$$

$$y = -2z - 4$$

$2z + 2 + 4 + 4 = 14$

$$\frac{30 - 17y - 27z + 2y + 3z}{7} = 6$$

$$\frac{30 - 17y - 27z + 2y + 3z}{7} = 6$$

$$\frac{-3y - 6z + 30}{7} = 6$$



$$\frac{-3(-2z - 4) - 6z + 30}{7} = 6$$

$$\frac{-3(-2z - 4) - 3 \cdot 2z + 3 \cdot 10}{7} = 6$$

$$3(-(-4 - 2z) - 2z + 10)$$

$$-(-4 - 2z) - 2z + 10$$

$$-4 - 2z = -2 \cdot 2 - 2z$$

$$2(z + 2) - 2z + 10$$

$$2(z + 2) - 2z + 2 \cdot 5$$

$$2(2 + 2 - 2 + 5)$$

$$3 \cdot 14 = \frac{42}{7}$$

$$6 = 6$$

$$x = z + 14, y = -2z - 4, z \text{ is free}$$

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$$3b) x = z + 14$$

$$z = 0:$$

$$x = 0 + 14$$

$$\boxed{x = 14}$$

$$y = -2z - 4$$

$$y = -2(0) - 4$$

$$\boxed{y = -4}$$

$$z = 1:$$

$$x = 1 + 14$$

$$\boxed{x = 15}$$

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

$$\boxed{y = -6}$$

$$z = -1:$$

$$x = -1 + 14$$

$$\boxed{x = 13}$$

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

$$\boxed{y = -2}$$

3 solutions:

$$\begin{matrix} x & y & z \\ (14, -4, 0), & (15, -6, 1), & (13, -2, -1) \end{matrix}$$

+10

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$$f) 7x + 17y + 27z = 30; \quad 2x + 5y + 8z = 3; \quad x + 2y + 3z = 6$$

$$\begin{array}{l|l|l} 2 \cdot (7x + 17y + 27z = 30) & 7 \cdot (2x + 5y + 8z = 3) & 14 \cdot (x + 2y + 3z = 6) \\ \hline 14x + 34y + 54z = 60 & 14x + 35y + 56z = 21 & 14x + 28y + 42z = 84 \\ -14x + 34y + 54z = 60 & -14x + 34y + 54z = 60 & -14x + 84y + 54z = 60 \\ \hline & y + 2z = -39 & -6y - 12z = 24 \end{array}$$

$$6(y + 2z = -39)$$

$$6y + 12z = -234$$

$$+ \quad -6y - 12z = 24$$

$$\hline 0 = -210 \quad \text{What?!? ABSURD!}$$

System of equations has NO SOLUTION,
assuming I did my steps correctly!

You did! 😊 There are
a lot of ways to reach
the correct answer.

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