MAT1340

WP #4

Cacheno

4/21/23

51/70

1. $2x+5y=20$
   $3x-2y=18$ >

first way

$5y=20-2x$

$3x-2y=18$

$\frac{5y}{5}=\frac{20}{5}+\frac{-2x}{5}$

$3x-2y=18$ ✓

$y=\frac{20}{5}+\frac{-2x}{5}$

$3x-2y=18$

$y=4-\frac{2x}{5}$

$3x-2y=18$

$-2y=18-3x$

$y=4-\frac{2x}{5}$ → $\frac{-2y}{-2}=\frac{18}{-2}+\frac{-3x}{-2}$

$y=4-\frac{2x}{5}$

→

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$$y = \frac{18}{-2} + \frac{-3x}{-2}$$

$$y = 4 - \frac{2x}{5}$$

$$y = -9 + \frac{-3x}{-2}$$

$$y = 4 - \frac{2x}{5}$$

$$y = -9 + \frac{3x}{2}$$

$$y = 4 - \frac{2x}{5}$$

Set up for your graph like this...

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

$2x + 5y = 20$

x	y
0	4
10	0

$\rightsquigarrow$ (0,4) A

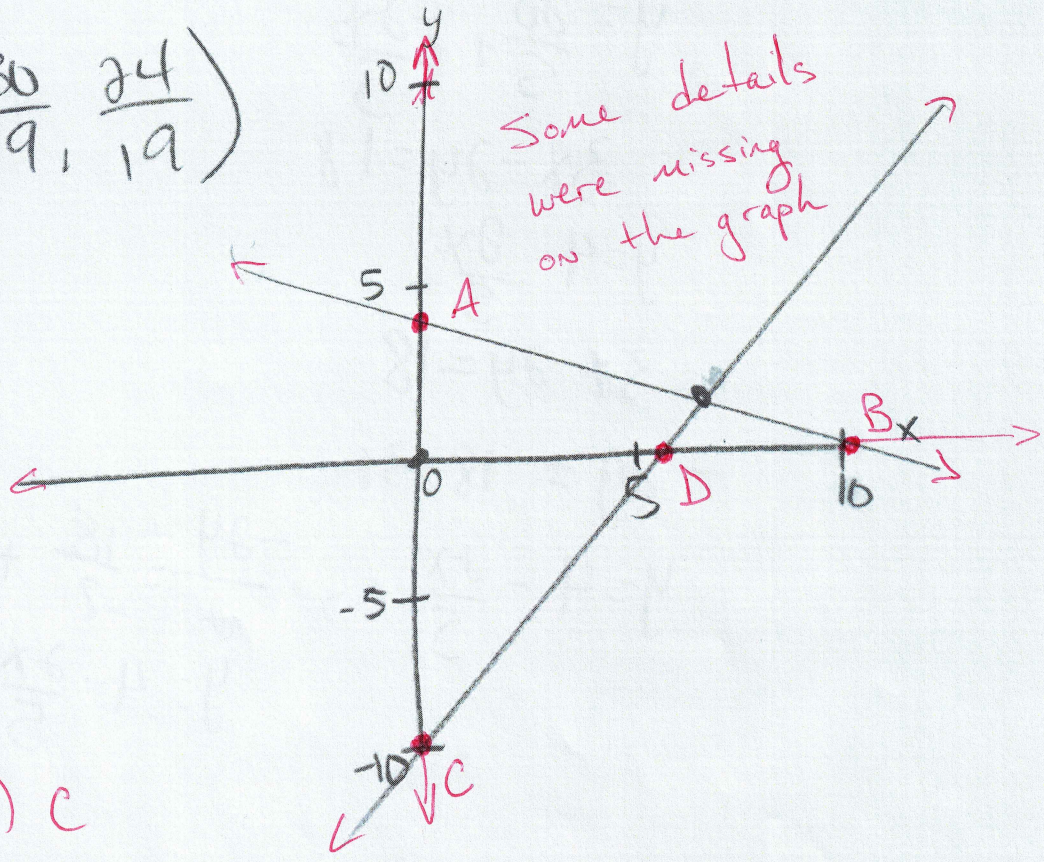
(10,0) B

$3x - 2y = 18$

x	y
0	-9
6	0

(0,-9) C

$\rightsquigarrow$ (6,0) D



Some details were missing on the graph

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Answers

2nd way: Substitution

$2x = 20 - 5y$

$3x - 2y = 18$

divide each term by 2 & simplify

$\frac{2x}{2} = \frac{20}{2} + \frac{-5y}{2}$

$3x - 2y = 18$ → simplify left side → cancel common factor

$\frac{2x}{2} = \frac{20}{2} + \frac{-5y}{2}$

$3x - 2y = 18$ → divide x by 1

$x = \frac{20}{2} + \frac{-5y}{2}$

$3x - 2y = 18$ → simplify R side

divide 20 by 2

$x = 10 + \frac{-5y}{2}$

$3x - 2y = 18$ — Replace all occurrences of x with $10 - \frac{5y}{2}$ in each equation

$3\left(10 - \frac{5y}{2}\right) - 2y = 18$

$x = 10 - \frac{5y}{2}$ → simplify

$3(10 - \frac{5y}{2}) - 2y$

$3 \cdot 10 + 3\left(-\frac{5y}{2}\right) - 2y = 18$

$x = 10 - \frac{5y}{2}$ →

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multiply 3 by 10

$30 + 3\left(\frac{-5y}{2}\right) - 2y = 18$

$x = 10 - \frac{5y}{2}$ → multiply by $3\left(\frac{-5y}{2}\right)$

$30 - 3\frac{5y}{2} - 2y = 18$

$x = 10 - \frac{5y}{2}$ → combine $3 \& \frac{5y}{2}$

$30 + \frac{-3(5y)}{2} - 2y = 18$ $\quad x = 10 - \frac{5y}{2}$

multiply 5 by -3 $\quad 30 + \frac{-15y}{2} - 2y = 18$

$x = 10 - \frac{5y}{2}$ → move negative in front of fraction

$30 - 15y - 2y = 18$

$x = 10 - \frac{5y}{2}$ → $\frac{30 + -15y - 2y \cdot 2}{2} = 18$

$x = 10 - \frac{5y}{2}$ → simplify

$30 - \frac{19y}{2} = 18$

$x = 10 - \frac{5y}{2}$ → solve for y

$30 - \frac{19y}{2} = 18$ $\quad y = \frac{24}{19}$ $\quad x = 10 - \frac{5y}{2}$

$x = 10 - \frac{5\left(\frac{24}{19}\right)}{2}$ $\quad x = 10 - \frac{60}{19}$, $\quad x = 10 \cdot \frac{19}{19} - \frac{60}{19}$, $\quad x = \frac{10 \cdot 19}{19} - \frac{60}{19} = \frac{130}{19}$

$x = \frac{130}{19}, y = \frac{24}{19}$

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3rd way:

$2x+5y=20, 3x-2y=18$

$(-3)\cdot(2x+5y)=(-3)(20)$

$(2)\cdot(3x-2y)=(2)(18)$ → simplify

$-6x-15y=-60$ } add the two equations
$6x-4y=36$ } together to eliminate x

$-19y=-84$ → divide each term by -19 & simp.

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

$-6x-15\left(\frac{24}{19}\right)=-60$

$-15\left(\frac{24}{19}\right)=-6x+\frac{-15\cdot24}{19}=-60$

multiply -15 by 24

$-6x+\frac{-360}{19}=-60$

$-6x-\frac{360}{19}=-60$ → Add $\frac{360}{19}$ to both sides

$-6x=-60+\frac{360}{19}$ → $-6x=-60\cdot\frac{19}{19}+\frac{360}{19}$

Combine -60 & $\frac{19}{19}$. $-6x=\frac{-60\cdot19}{19}+\frac{360}{19}$

$-6x=\frac{-60\cdot19+360}{19}$ $=-6x=\frac{-780}{19}$

→

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Cached

Continued...

$$-6x = \frac{-780}{19}$$ - move the negative in front of the fraction.

$$-6x = -\frac{780}{19}$$

Divide each term in $-6x = -\frac{780}{19}$ by -6

$$x = \frac{130}{19} \qquad y = \frac{24}{19}$$

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(2) $2x - 2y + z = -13$
$3x - 5y - z = -21$
$x - 2z = 7$

$2x - 2y + z = -13$
$3x - 5y - z = -21$ } eliminate x

It went wrong kinda early

$(-3)\cdot(2x - 2y) = (-3)(-15)$, $(2)\cdot(3x - 5y) = (2)(-19)$

↳ simplify → $-6x + 6y = 45$
$6x - 10y = -38$ } Add together to eliminate x.

$-4y = 7$

$3x - 5y - z = -21$
$x - 2z = 7$ } move all terms containing variables to the left

$3x - 5y = -19$, $x - 2z = 7$

$3x - 5y = -19$, $(-3)\cdot(x - 2z) = (-3)(7)$ → simplify

$3x - 5y = -19$
$-3x + \quad = -21$ } add together eliminate x

$6z - 5y = -40$

+6

$-4y = 7$
$-5y + 6z = -40$ →

$z = -\frac{65}{8}$
$y = -\frac{7}{4}$
$x = -\frac{37}{4}$

$x = \frac{1}{5}$
$y = 5$
$z = -\frac{17}{5}$

(7)

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3. $7x+17y+27z=30$
$2x+5y+8z=8$
$x+2y+3z=6$

$7x+17y+27z=30$
$2x+5y+8z=8$ } Eliminate x

$(-2)\cdot(7x+17y+27z)=(-2)(30)$
$(7)\cdot(2x+5y+8z)=(7)(8)$ → simplify

$-14x-34y-54z=-60$
$14x+35y+56z=56$
$-$
$y+2z=-4$

$2x+5y+8z=8$
$x+2y+3z=6$ } $(-2)\cdot(x+2y+3z)=(-2)(6)$ simplify

$2x+5y+8z=8$
$-2x-4y-6z=-12$

$0=0$

One more step and you have → $y+2z=-4$ ← the "y"

a) wanted x= and y= in terms of z, z is free
ie: $y=-2z-4$, $x=z+14$, $z=z$

b) I do not see any work relating to part b.

+7

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Cochran
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$$\begin{aligned} 7x+17y+27z&=30\\ 2x+5y+8z&=3\\ x+2y+3z&=6 \end{aligned}$$

(4.)

1. move all terms not containing x to the R side

$$\left.\begin{aligned} x+3z&=6-2y\\ 7x+17y+27z&=30\\ 2x+5y+8z&=3 \end{aligned}\right\}$$ subtract 3z

$$\begin{aligned} x&=6-2y-3z\\ 7x+17y+27z&=30\\ 2x+5y+8z&=30 \end{aligned}$$

Replace all occurences of x with $6-2y-3z$

$$7(6-2y-3z)+17y+27z=30$$

$$\begin{aligned} x&=6-2y-3z\\ 2x+5y+8z&=3 \end{aligned}$$ → simplify left side

$$\begin{aligned} 42+3y+6z&=30\\ x&=6-2y-3z\\ 2x+5y+8z&=3 \end{aligned}$$ ✓

Replace all occurences of x with $6-2y-3z$.

$2x+5y+8z=3$ with $2(6-2y-3z)+5y+8z=3$

$$\begin{aligned} 42+3y+6z&=30\\ x&=6-2y-3z \end{aligned}$$ → simplify L side

$$2(6-2y-3z)+5y+8z$$

$$\begin{aligned} 12+y+2z&=3\\ 42+3y+6z&=30\\ x&=6-2y-3z \end{aligned}$$

→ subtract 12 from both sides

$$\begin{aligned} y+2z&=3-12\\ 42+3y+6z&=30\\ x&=6-2y-3z \end{aligned}$$

→

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Cachuela

Continued....

Subtract 2z from both sides

$y = 3 - 12 - 2z$

$42 + 3y + 6z = 30$

$x = 6 - 2y - 3z$

Subtract 12 from 3

$y = -9 - 2z$

$42 + 3y + 6z = 30$

$x = 6 - 2y - 3z$

Replace all occurences of y with $-9-2z$ in each equation

$x = 24 + z$

$15 = 30 \rightarrow$ 15 = 30 is not true it is absurd

~~$y = -9 - 2z$~~ there is no solution.

+10

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