

Name: Solutions

Date: \_\_\_\_\_

**MidYear Review**  
Systems of Equations

1. What is the solution to the system of equations below?

Eq. 1) 
$$\frac{3y = -12x + 78}{3 \quad 3}$$
$$y = -4x + 26$$

Eq. 2) 
$$6x - 2y - 32 = 0$$
$$\begin{array}{r} -6x \quad +32 \quad -6x \quad +32 \\ \hline -2y = -6x + 32 \\ \hline -2 \quad \quad -2 \\ y = 3x - 16 \end{array}$$

$$\begin{array}{r} -4x + 26 = 3x - 16 \\ +4x \quad \quad +4x \\ \hline 26 = 7x - 16 \\ +16 \quad \quad +16 \\ \hline 42 = 7x \\ \frac{42}{7} = \frac{7x}{7} \\ 6 = x \end{array}$$

$$\begin{array}{l} y = 3x - 16 \\ \downarrow \\ y = 3(6) - 16 \\ y = 18 - 16 \\ y = 2 \end{array}$$

ANSWER:  $(6, 2)$

Answer: The solution to the system of equations is: ( 6 , 2 )

2. Gordon doesn't believe in banks or paper money and has decided instead to buy and then hide gold and silver bars in his basement.

Last year, he bought **19 silver** bars and **4 gold** bars for a total of \$ **11 650**.

This year, he buys **2 silver** bars and **8 gold** bars for a total of \$ **10 700**

Next year, he plans to spend \$ **14 950** buying **7 silver** bars and **some gold** bars.

**How many gold bars** will he buy next year?

$$x = \$ \text{ silver}$$

$$y = \$ \text{ gold.}$$

$$19x + 4y = 11650$$

$$\underline{-19y}$$

$$4y = -19x + 11650$$

$$\frac{4y}{4} = \frac{-19x + 11650}{4}$$

$$y = -4.75x + 2912.5$$

$$2x + 8y = 10700$$

$$\underline{-2x}$$

$$8y = -2x + 10700$$

$$\frac{8y}{8} = \frac{-2x + 10700}{8}$$

$$y = -0.25x + 1337.5$$

$$\begin{array}{r} -4.75x + 2912.5 = -0.25x + 1337.5 \\ +4.75x \qquad \qquad \qquad +4.75x \\ \hline 2912.5 = 4.50x + 1337.5 \\ -1337.5 \qquad \qquad \qquad -1337.5 \\ \hline 1575 = 4.50x \\ \frac{1575}{4.50} = \frac{4.50x}{4.50} \end{array}$$

$$350 = x \quad \text{SILVER}$$

$$y = -0.25x + 1337.5$$

$$y = -0.25(350) + 1337.5$$

$$y = -87.5 + 1337.5$$

$$y = 1250 \quad \text{gold}$$

$$14950 = 7x + ?y$$

$$14950 = 7(350) + ?(1250)$$

$$14950 = 2450 + ?(1250)$$

$$\underline{-2450} \qquad \underline{-2450}$$

$$\frac{12500}{1250} = \frac{?(1250)}{1250}$$

$$10 = ?$$

10 GOLD BARS ?

Answer: Gordon will buy 10 gold bars

3. Brandon has decided to learn how to surf and must chose between two surfing schools  
Each surfing school has two different billing rules.

○ **School A** charges an **initial fee of \$ 705** and costs an additional **\$ 25 an hour**.

○ **School B**

- After 3 hours, they charge \$ 380
- After 7 hours, they charge \$ 640

$$y = ax + b$$

$$y = 25x + 705$$

- a) What are the **rules** for each school's billing? ✓
- b) Which school is **cheaper** to start at?
- c) When does it not matter which school you choose. (i.e. After **how many hours** of lessons will each school's billing fee **be the same** for the same number of hours)
- d) What is the **amount** each school will charge when they charge the same amount for the same number of hours?

$$a = \frac{y_2 - y_1}{x_2 - x_1} = \frac{640 - 380}{7 - 3} = \frac{260}{4} = 65$$

$$y = ax + b$$

$$y = 65x + b$$

$$380 = 65(3) + b$$

$$380 = 195 + b$$

$$\begin{array}{r} 380 \\ - 195 \\ \hline 185 = b \end{array}$$

$$y = 65x + 185$$

$$\begin{array}{r} 25x + 705 = 65x + 185 \\ - 25x \qquad - 25x \\ \hline 705 = 40x + 185 \\ - 185 \qquad - 185 \\ \hline 520 = 40x \\ \frac{520}{40} = \frac{40x}{40} \\ 13 = x \end{array}$$

$$705 = 40x + 185$$

$$520 = 40x$$

$$13 = x$$

$$y = 25x + 705$$

$$y = 25(13) + 705$$

$$y = 325 + 705$$

$$y = 1030$$

Answers:

a) School A, rule:  $y = 25x + 705$

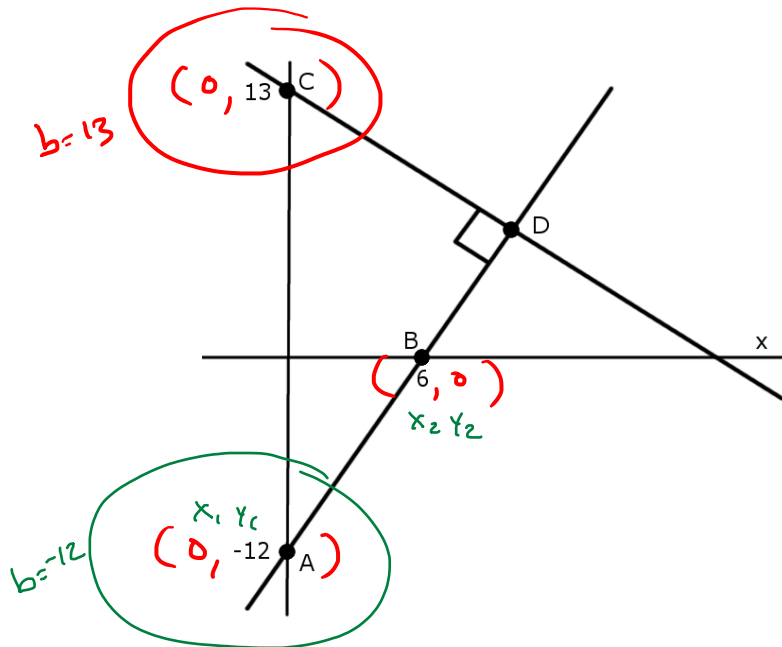
School B, rule:  $y = 65x + 185$

b) School **B** is cheaper to start taking lessons at.

c) The two schools charge the **same amount** after teaching Luke for **13** hours

d) The **fee** at that point would be \$ **1030**

4. What are the coordinates of point D, where the **two lines meet**?  
(Drawing not to scale)



LINE AB

$$a = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - (-12)}{6 - 0} = \frac{12}{6} = 2$$

$$y = ax + b$$

$$y = 2x + b$$

$$-12 = 2(0) + b$$

$$-12 = b$$

Rule AB

$$y = 2x - 12$$

POINT OF INTERSECTION

$$\begin{array}{r} 2x - 12 = -0.5x + 13 \\ +0.5x \qquad \qquad +0.5x \\ \hline \end{array}$$

$$\begin{array}{r} 2.5x - 12 = 13 \\ \qquad \qquad +12 \qquad \qquad +12 \\ \hline \end{array}$$

$$\begin{array}{r} 2.5x \qquad \qquad = \qquad \qquad 25 \\ \hline 2.5 \qquad \qquad \qquad \qquad \qquad 2.5 \end{array}$$

$$x = 10$$

$$y = 2x - 12$$

$$y = 2(10) - 12$$

$$y = 20 - 12 = 8$$

LINE CD (⊥ N.R.S)

slope.

$$a: \frac{2}{1} \rightarrow -\frac{1}{2} = -0.5$$

$$y = ax + b$$

$$y = -0.5x + b$$

$$y = -0.5x + 13$$

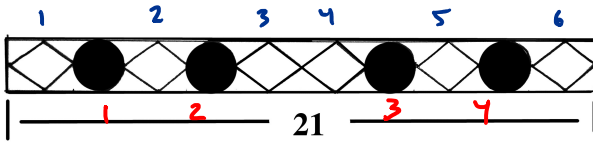
Rule CD.

Line AB:  $y = \underline{y = 2x - 12}$

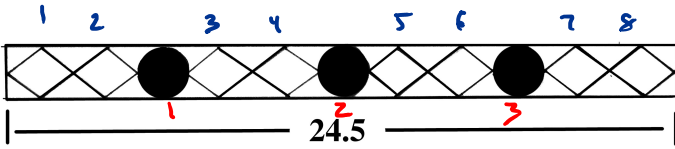
Line CD:  $y = \underline{y = -0.5x + 13}$

Answer: The coordinates of point D are ( 10 , 8 )

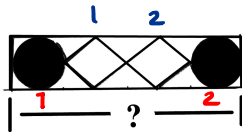
5. Three line segments are made up of circles and diamonds.  
Determine the length of the smallest segment.



$$6x + 4y = 21$$



$$8x + 3y = 24.5$$



$$2x + 2y = ?$$

$$\begin{aligned} 6x + 4y &= 21 \\ -6x & \\ \hline 4y &= -6x + 21 \\ \frac{4y}{4} &= \frac{-6x + 21}{4} \\ y &= -1.5x + 5.25 \end{aligned}$$

$$\begin{aligned} 8x + 3y &= 24.5 \\ -8x & \\ \hline 3y &= -8x + 24.5 \\ \frac{3y}{3} &= \frac{-8x + 24.5}{3} \\ y &= -2.\bar{6}x + 8.\bar{1}\bar{6} \end{aligned}$$

$$\begin{aligned} -1.5x + 5.25 &= -2.\bar{6}x + 8.\bar{1}\bar{6} \\ +2.\bar{6}x & \\ \hline 1.\bar{1}\bar{6}x + 5.25 &= 8.\bar{1}\bar{6} \end{aligned}$$

$$\begin{aligned} 1.\bar{1}\bar{6}x + 5.25 &= 8.\bar{1}\bar{6} \\ -5.25 & \\ \hline 1.\bar{1}\bar{6}x &= 2.\bar{9}\bar{1}\bar{6} \end{aligned}$$

$$\frac{1.\bar{1}\bar{6}x}{1.\bar{1}\bar{6}} = \frac{2.\bar{9}\bar{1}\bar{6}}{1.\bar{1}\bar{6}}$$

$$x = 2.5$$

$$y = -1.5x + 5.25$$

$$y = -1.5(2.5) + 5.25$$

$$y = -3.75 + 5.25$$

$$y = 1.5$$

$$2x + 2y = ?$$

$$2(2.5) + 2(1.5) = ?$$

$$5 + 3 = ?$$

$$8 = ?$$

The smallest segment measures 8 units