Name: Solutions
Date: _____

MidYear Review
Systems of Equations

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

Eq. 1) $3y = -12x + 78$

$\frac{3y}{3} = \frac{-12x + 78}{3}$

$y = -4x + 26$

Eq. 2) $6x - 2y - 32 = 0$

$-6x \quad +32 \qquad -6x + 32$

$\frac{-2y}{-2} = \frac{-6x + 32}{-2}$

$y = 3x - 16$

$-4x + 26 = 3x - 16$

$+4x \qquad +4x$

$26 = 7x - 16$

$+16 \qquad +16$

$\frac{42}{7} = \frac{7x}{7}$

$6 = x$

$y = 3x - 16$

$y = 3(6) - 16$

$y = 18 - 16$

$y = 2$

ANSWER: $(6, 2)$ (x, y)

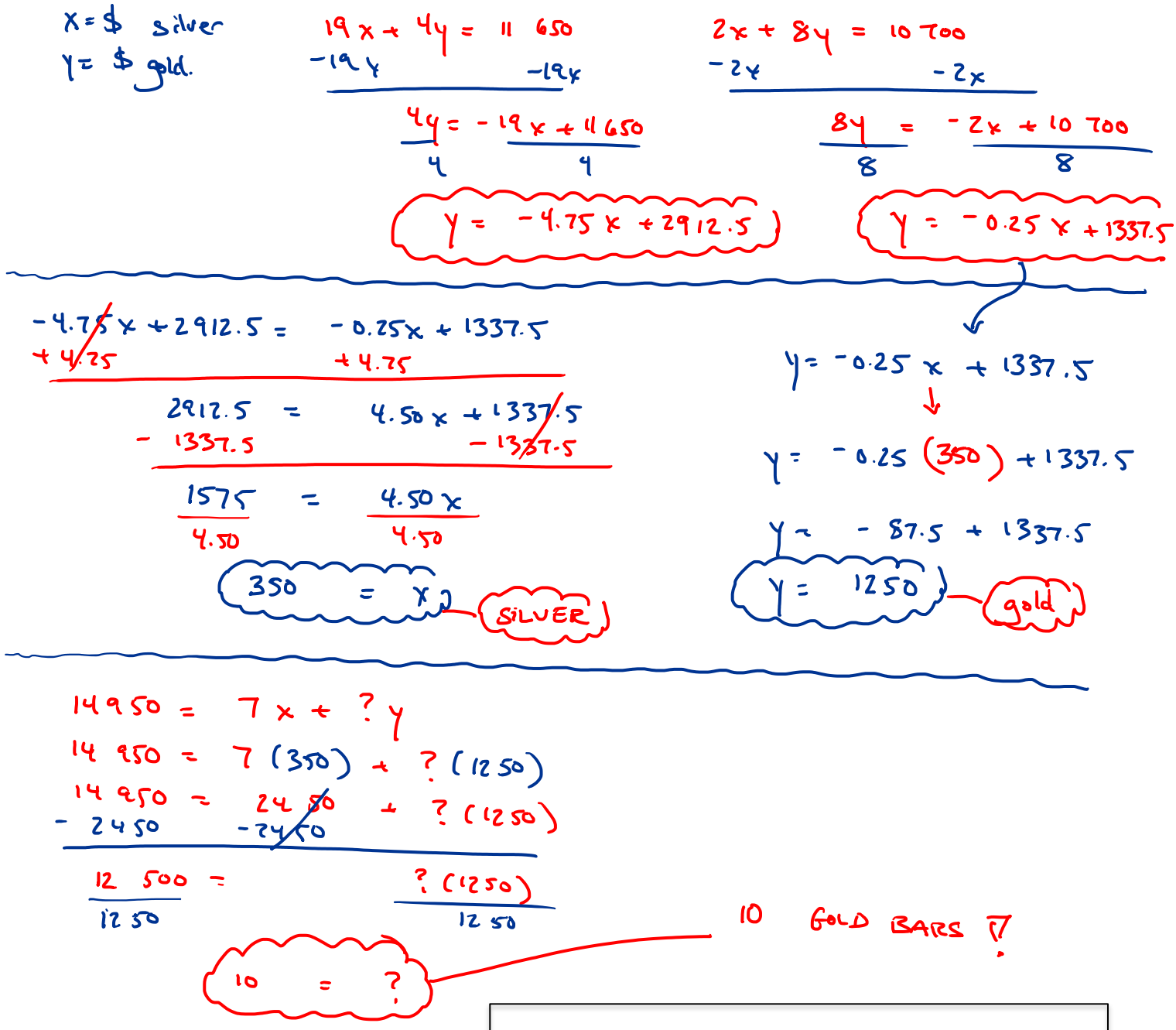
Answer: The solution to the system of equations is: (6 , 2)

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?



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?

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

$y = ax + b$

$y = 65x + b$

$380 = 65(3) + b$

$380 = 195 + b$

$-195 \quad -195$

$185 = b$

$y = 65x + 185$

$25x + 705 = 65x + 185$

$-25x \quad -25x$

$705 = 40x + 185$

$-185 \quad -185$

$\frac{520}{40} = \frac{40x}{40}$

$13 = x$

$y = 25x + 705$

$y = 25(13) + 705$

$y = 325 + 705$

$y = 1030$

Answers:

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

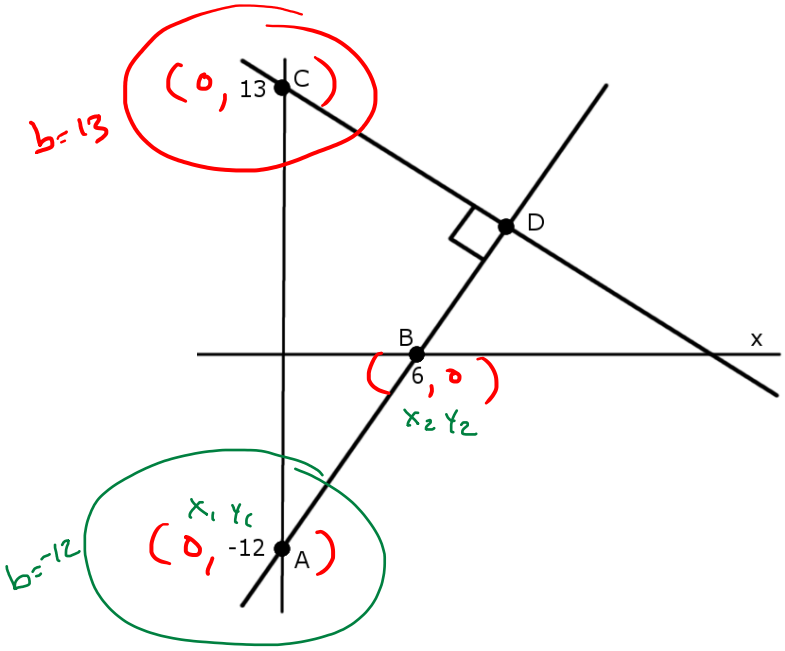
School B, rule: $y = 65x + 185$

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 $\overline{AB}$

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

$y = ax + b$

$y = 2x + b$

$-12 = 2(0) + b$

$-12 = b$

Rule $\overline{AB}$

$y = 2x - 12$

LINE $\overline{CD}$ ($\perp$ 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 $\overline{CD}$.

POINT OF INTERSECTION

$2x - 12 = -0.5x + 13$

$+0.5x \quad +0.5x$

$2.5x - 12 = 13$

$+12 \quad +12$

$\frac{2.5x}{2.5} = \frac{25}{2.5}$

$x = 10$

$y = 2x - 12$

$y = 2(10) - 12$

$y = 20 - 12 = 8$

Line AB: y = $y = 2x - 12$

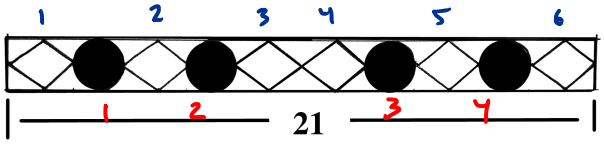
Line CD: y = $y = -0.5x + 13$

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

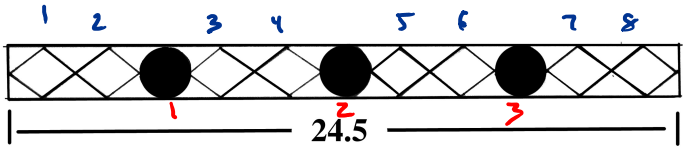
◇ = x

● = y

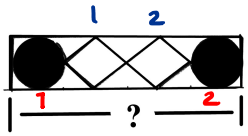
5. Three line segments are made up of circles and diamonds. Determine the length of the smallest segment.



$6x + 4y = 21$



$8x + 3y = 24.5$



$2x + 2y = ?$

$6x + 4y = 21$

$-6x \quad -6x$

$\frac{4y}{4} = \frac{-6x + 21}{4}$

$y = -1.5x + 5.25$

$8x + 3y = 24.5$

$-8x \quad -8x$

$\frac{3y}{3} = \frac{-8x + 24.5}{3}$

$y = -2.\overline{6}x + 8.1\overline{6}$

$-1.5x + 5.25 = -2.\overline{6}x + 8.1\overline{6}$

$+2.\overline{6}x \quad +2.\overline{6}x$

$1.1\overline{6}x + 5.25 = 8.1\overline{6}$

$-5.25 \quad -5.25$

$\frac{1.1\overline{6}x}{1.1\overline{6}} = \frac{2.91\overline{6}}{1.1\overline{6}}$

$x = 2.5$

$y = -1.5x + 5.25$

$y = -1.5(2.5) + 5.25$

$y = -3.75 + 5.25$

$y = 1.5$

$2x + 2y = ?$

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

$5 + 3 = ?$

$8 = ?$

The smallest segment measures 8 units