ALL QUESTIONS ARE 12 POINTS. Read instructions! Recommend checking for partial credit.

Solve each system by substitution. Then check the solution algebraically

1) $11x - 10y = 6$
   $y = 5x + 15$

$\Rightarrow$

$11x - 10(5x + 15) = 6$

$11x - 50x - 150 = 6$

$-39x - 150 = 6$

$+150 \quad +150$

$\dfrac{-39x}{-39} = \dfrac{156}{-39}$

$\boxed{x = -4}$

FIND Y

$y = 5(-4) + 15$

$\boxed{y = -5}$

C: $11(-4) - 10(-5) = 6$

$-44 + 50 = 6$

$6 = 6 ✓$

C: $-5 = 5(-4) + 15$

$-5 = -5 ✓$

Solve each system by elimination. Then check the solution algebraically

2) $x + 5y = -24$
   $-x + 5y = 4$

$\dfrac{10y}{10} = \dfrac{-20}{10}$

$\boxed{y = -2}$

FIND X!

$x + 5(-2) = -24$

$x - 10 = -24$

$+10 \quad +10$

$\boxed{x = -14}$

C: $-14 + 5(-2) = -24$

$-14 - 10 = -24$

$-24 = -24 ✓$

C: $-(-14) + 5(-2) = 4$

$14 - 10 = 4$

$4 = 4 ✓$

Solve the system using either the substitution or elimination method.

3) $6x - 6y = -18 \rightarrow 6x - 6y = -18$

$-1*(7x - 6y = -19) \rightarrow -7x + 6y = 19$

$\rightarrow \dfrac{-x}{-1} = \dfrac{1}{-1}$

$\boxed{x = -1}$

FIND Y :

$6(-1) - 6y = -18$

$-6 - 6y = -18$

$+6 \qquad +6$

$\dfrac{-6y}{-6} = \dfrac{-12}{-6}$

$\boxed{y = 2}$

$C: -18 = -18 \checkmark \qquad C: -19 = -19 \checkmark$

4) $\left.\begin{array}{l} x = 6y - 1 \\ 4x - 8y = 20 \end{array}\right] = \begin{array}{l} x - 6y = -1 \\ 4x - 8y = 20 \end{array}$

Sub Method

$4(6y - 1) - 8y = 20$

$24y - 4 - 8y = 20$

$16y - 4 = 20$

$\qquad +4 \qquad +4$

$\dfrac{16y}{16} = \dfrac{24}{16}$

$\boxed{y = 1.5}$

$C: 8 = 8 \checkmark$

FIND X :

$x = 6(1.5) - 1$

$\boxed{x = 8}$

$C: 20 = 20 \checkmark$

5) $\left(5x - 8y = -2\right)*8 \rightarrow 40x - 64y = -16$

$\left(-8x + 10y = -8\right)*5 \rightarrow -40x + 50y = -40$

$\dfrac{-14y}{-14} = \dfrac{-56}{-14}$

$\boxed{y = 4}$

FIND X

$5x - 8(4) = -2$

$5x - 32 = -2$

$+32 \qquad +32$

$\dfrac{5x}{5} = \dfrac{30}{5}$

$\boxed{x = 6}$

$C: -2 = -2 \checkmark \qquad C: -8 = -8 \checkmark$

6) $\left(-5x - y = 20\right)*3 \rightarrow -15x - 3y = 60$

$-7x + 3y = -16 \longrightarrow -7x + 3y = -16$

$\dfrac{-22x}{-22} = \dfrac{44}{-22}$

$\boxed{x = -2}$

FIND Y:

$-7(-2) + 3y = -16$

$14 + 3y = -16$

$-14 \qquad -14$

$\dfrac{3y}{3} = \dfrac{-30}{3}$

$\boxed{y = -10}$

$C: 20 = 20 \checkmark \qquad C: -16 = -16 \checkmark$

-2-

7) Micaela and Arjun each improved their yards by planting rose bushes and geraniums. They bought their supplies from the same store. Micaela spent $31 on 3 rose bushes and 2 geraniums. Arjun spent $100 on 10 rose bushes and 5 geraniums. What is the cost of one rose bush and the cost of one geranium?

Key Information:
Micaela — spent $31, 3 ROSES + 2 Geraniums
Arjun — spent $100, 10 ROSES + 5 Geraniums

Define variables:
$X =$ price of rose bush ($'s)
$Y =$ price of geranium ($'s)

Define system:

EQ1: $(3X + 2Y = 31) * 10 \rightarrow 30X + 20Y = 310$

EQ2: $(10X + 5Y = 100) * -3 \rightarrow -30X - 15Y = -300$

Solve the system:

$$\frac{5Y}{5} = \frac{10}{5}$$

$$\boxed{y = 2}$$

Answer (in words):

FIND X:

$$3x + 2(2) = 31$$
$$3x + 4 = 31$$
$$\quad\; -4 \quad -4$$
$$\frac{3X}{3} = \frac{27}{3} \qquad \boxed{X = 9}$$

A Rose bush costs $9 and a geranium plant costs $2.

Bonus Questions

Solve the system using either the substitution or elimination method.

#84
$$6x + 2y = 12 \quad) * 9$$
$$-9x - 3y = -30 \quad) * 6$$

$$54x + 18y = 108$$
$$-54x - 18y = -180$$
_____
$$0 \neq -72 \quad F$$

(NO SOLUTION)

#B2
$$3x - 6y = 6$$
$$x = 2y + 2$$

$$3(2y + 2) - 6y = 6$$
$$6y + 6 - 6y = 6$$
$$6 = 6 \checkmark \quad \underline{TRUE}$$

| INFINITE SOLUTIONS |

9) BONUS (10pts):

Beth and Paul are selling cookie dough for a school fundraiser. Customers can buy packages of sugar cookie dough and packages of oatmeal cookie dough.

Beth sold 12 packages of sugar cookie dough and 9 packages of oatmeal cookie dough for a total of $271.20. Paul sold 20 packages of sugar cookie dough and 6 packages of oatmeal cookie dough for a total of $297.20.

Find the cost each of one package of sugar cookie dough and one package of oatmeal cookie dough.

Key Information (0pts): Beth - sold 12 sugar, 9 oatmeal for $271.20
Paul sold 20 sugar, 6 oatmeal for $297.20

Define variables (2pts):

X= Cost of sugar cookie dough ($'s)

Y= Cost of oatmeal cookie dough ($'s)

Define system (4pts):

EQ1: $(12X + 9Y = \$271.20) * 20 \rightarrow 240X + 180Y = 5424$

EQ2: $(20X + 6Y = \$297.20) * -12 \rightarrow -240X - 72Y = -3566.4$

Solve the system (2pts):

$$\frac{108Y}{108} = \frac{18,576}{108}$$

$$\boxed{Y = \$17.20}$$

FIND X

$20X + 6(17.20) = 297.20$

$20X + 103.2 = 297.20$

$$\frac{20X}{20} = \frac{194}{20}$$

Answer (in words) - (2pts): $\boxed{X = 9.70}$

SUGAR COOKIE DOUGH COSTS $9.70 AND OATMEAL DOUGH COSTS $17.20