

Solve each system.

$$\begin{aligned} 1. & \begin{cases} 3(5x - 4y = -47) \\ 2(7x + 6y = 27) \end{cases} \end{aligned}$$

$$\begin{aligned} 15x - 12y &= -141 \\ 14x + 12y &= 54 \end{aligned}$$

$$\frac{29x}{29} = \frac{-87}{29}$$

$$\boxed{x = -3}$$

$$-15 - 4y = -47$$

$$-4y = -32$$

$$\boxed{y = 8}$$

$$\begin{aligned} 2. & \begin{cases} 5x + 2y = 8 \\ -2(3x + y = 6) \end{cases} \end{aligned}$$

$$\begin{aligned} 5x + 2y &= 8 \\ -6x - 2y &= -12 \end{aligned}$$

$$-x = -4$$

$$\boxed{x = 4}$$

$$20 + 2y = 8$$

$$2y = -12$$

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

$$\begin{aligned} 3. & \begin{cases} 3x + 2y + z = 7 \\ (2x - y + 5z = 20)^2 \\ 3x + 2z = 12 \end{cases} \end{aligned}$$

$$\begin{aligned} 3x + 2y + z &= 7 \\ 4x - 2y + 10z &= 40 \end{aligned}$$

$$\begin{aligned} 3(7x + 11z = 47) \\ -7(3x + 2z = 12) \end{aligned}$$

$$\begin{aligned} 21x + 33z &= 141 \\ -21x - 14z &= -84 \end{aligned}$$

$$\frac{19z}{19} = \frac{57}{19}$$

$$\boxed{z = 3}$$

$$\begin{aligned} 3x + 6 &= 12 \\ 3x &= 6 \end{aligned}$$

$$\boxed{x = 2}$$

$$6 + 2y + 3 = 7$$

$$2y + 9 = 7$$

$$2y = -2$$

$$\boxed{y = -1}$$

4. A movie theater sells tickets for \$8.00 each, with seniors receiving a discount of \$2.00. One evening the theater sold 525 tickets and took in \$3580 in revenue. How many of each type of ticket were sold?

$$\begin{aligned} x &= \# \text{ tickets} & -6(x + y = 525) \\ y &= \# \text{ seniors} & 8x + 6y = 3580 \end{aligned}$$

$$\begin{aligned} -6x - 6y &= -3150 \\ 8x + 6y &= 3580 \end{aligned}$$

$$2x = 430$$

$$\boxed{x = 215}$$

$$215 + y = 525$$

$$\boxed{y = 310}$$

5. A landscape company is hired to plant trees in three new subdivisions. The company charges the developer for each tree planted, an hourly rate to plant the trees, and a fixed delivery charge. In one subdivision, it took 166 hours to plant 250 trees for a cost of \$7520. In a second subdivision, it took 124 hours to plant 200 trees for a cost of \$5945. In the final subdivision it took 200 hours to plant 300 trees for a cost of \$8985. Determine the cost for each tree, the hourly rate to plant, and the delivery charge.

$x$  = cost per tree

$y$  = hourly rate to plant

$z$  = del. fee

$$250x + 166y + z = 7520$$

$$200x + 124y + z = 5945$$

$$300x + 200y + z = 8985$$

$$\begin{aligned} x &= \$19.95 \text{ cost per tree} \\ y &= \$13.75 \text{ hourly rate} \\ z &= \$250 \text{ del. fee} \end{aligned}$$

6. **Pictures** A studio sells photographs and prints. It cost \$20 to purchase each photograph and it takes 2 hours to frame it. It costs \$25 to purchase each print and it takes 5 hours to frame it. The store has at most \$400 to spend and at most 60 hours to frame. It makes \$30 profit on each photograph and \$50 profit on each print. Find the number of each that the studio should purchase to maximize profits. Be sure to show all work (constraints, graph, etc.)

	Photograph	Print
<b>Cost</b>	20	25
<b>Framing Time</b>	2	5

$x = \# \text{ photographs}$   
 $y = \# \text{ prints}$

$$20x + 25y \leq 400 \quad (20, 0) \quad (0, 16)$$

$$2x + 5y \leq 60$$

$$(30, 0) \quad (0, 12)$$

$$P = 30x + 50y$$

$(0, 12)$	\$ 600
$(10, 8)$	\$ 700
$(20, 0)$	\$ 600

$$\begin{array}{r} 4x + 5y = 80 \\ -(2x + 5y = 60) \\ \hline \end{array}$$

$$2x = 20$$

$$x = 10$$

$$y = 8$$

