

5.5 Problems Involving Linear Systems

During a clearance sale, all shirts are on sale at one price and all sweaters at another price. Two shirts and four sweaters cost \$98. One shirt and three sweaters cost \$69. Determine the cost of one sweater and the cost of one shirt.

x = cost of 1 sweater
 y = " " " 1 shirt

$$4x + 2y = 98 \quad \textcircled{1}$$

$$3x + y = 69 \quad \textcircled{2}$$

$$6x + 2y = 138 \quad \textcircled{2} \times 2$$

$$\underline{4x + 2y = 98 \quad \textcircled{1}}$$

$$2x = 40 \quad \text{Subtract}$$

$x = 20$ is price for 1 sweater
 Sub into $\textcircled{2}$

$$3(20) + y = 69$$

$$60 + y = 69$$

$$y = \$9 \text{ for 1 shirt}$$

Quick
Check

A school held a raffle and sold 480 tickets. Students were charged \$1 per ticket and teachers \$5 per ticket. Total ticket sales were \$560. Determine the number of teachers and the number of students that bought tickets.

$$x = \# \text{ teachers}$$

$$y = \# \text{ students}$$

$$x + y = 480 \quad (1)$$

$$5x + y = 560 \quad (2)$$

$$-4x = -80$$

Subtract

$$x = 20 \text{ teachers}$$

Sub into (1)

$$20 + y = 480$$

$$y = 460 \text{ students}$$

Check

$$20(5) + 460$$

$$= 100 + 460$$

$$= 560 \checkmark$$

A couple needs a \$100 000 loan to purchase a home. Because of their finances, they want to pay only interest for the first year. They are able to get one loan at 7% interest and a second loan at 10% interest. The interest for the first year totaled \$7750. Determine the amount borrowed at 7% and the amount borrowed at 10%.

$x =$ money borrowed at 7%

$y =$ " " " at 10%

$$x + y = 100\,000 \quad \textcircled{1}$$

$$\left\{ \begin{array}{l} 0.07x + 0.10y = 7750 \quad \textcircled{2} \end{array} \right.$$

$$\left\{ \begin{array}{l} 0.07x + 0.07y = 7000 \quad \textcircled{1} \times 0.07 \end{array} \right.$$

$$0.03y = 750 \quad \text{Subtract}$$

$$y = \frac{750}{0.03} = \$25000 \quad \text{borrowed @ 10\%}$$

Sub into $\textcircled{1}$

$$x + 25000 = 100000$$

$$x = \$75000 \quad \textcircled{7\%}$$

Assignment: Pg. 334 1- 15 odds , 16, 18