

## Lesson 4 Solving Word Problems Using Systems

### Example 1

Kaitlin would like to buy a new furnace. One brand costs \$1200 to buy, and \$160 a month to operate. The other brand costs \$900 to buy and \$210 a month to operate.

*first C*  
*second furnace*

- Determine the number of months for which the total cost of either unit will be the same.
- Determine how much Kaitlin will save in one year by purchasing the more economical furnace. *12 months*

$$\text{Cost} = \text{cost to buy} + \text{cost/month} \times \text{number of months}$$

<i>first furnace</i>	$C = 1200 + 160m$
<i>second furnace</i>	$C = 900 + 210m$
<i>subtract</i>	$0 = 300 - 50m$
	$50m = 300$
	$6 = m$

a) 6 months

b)  $C = 1200 + 160(12)$   
 $= \$3120$

$C = 900 + 210(12)$   
 $= \$3420$

$\therefore$  savings of \$300

### Example 2

The sum of two numbers is 60 and their difference is 24. Determine the two numbers.

*x and y =*      *x - y =*

	$x + y = 60$
	$x - y = 24$
<i>add</i>	$2x = 84$
	$x = 42$

$x + y = 60$   
 $42 + y = 60$   
 $y = 18$

$\therefore$  the numbers are 18 and 42

# L3 Word Problems.notebook

## Pre-Calculus 10 Enriched Systems of Linear Equations

### Example 3

A man is 24 years older than his daughter. In 10 years, he will be 2.5 times her age. Determine the current ages of the man and his daughter.

$$\begin{aligned} \textcircled{1} \quad m - 24 &= d \\ m + 10 &= 2.5(d + 10) \\ m + 10 &= 2.5d + 25 \\ \textcircled{2} \quad m &= 2.5d + 15 \\ m &= 2.5(m - 24) + 15 \\ m &= 2.5m - 60 + 15 \\ -1.5m &= -45 \\ m &= 30 \end{aligned}$$

$$\begin{aligned} m - 24 &= d \\ 30 - 24 &= d \\ 6 &= d \end{aligned}$$

The man is 30 and his daughter is 6.

### Example 4

Chase emptied his piggy bank discovered \$10.05. In his piggy bank there were only quarters and dimes. Determine how many of each coin he had if there were 60 coins altogether.

	values	
q	0.25q	
d	0.10d	
total	\$10.05	

$$\begin{aligned} 0.25q + 0.10d &= 10.05 \\ q + d &= 60 \\ q &= 60 - d \end{aligned}$$

$$\begin{aligned} 0.25(60 - d) + 0.10d &= 10.05 \\ 15 - 0.25d + 0.10d &= 10.05 \\ -0.15d &= -4.95 \\ d &= 33 \end{aligned}$$

$$\begin{aligned} q &= 60 - 33 \\ &= 27 \end{aligned}$$

∴ he has 33 dimes and 27 quarters

pg. 306  
# 2, 3, 5, 6, 7, 8, 10

Try 12, 18

Review pg. 309