

## Algebra 2

### Linear Systems Applications Examples

Required Steps for Application Problems:

1. Define your variables
2. Write equations
3. Show work in solving the system
4. Write your answer in the context of the problem (units!!)

#### Example 1

You are selling tickets for a high school play. Student tickets cost \$4 and general admission tickets cost \$6. You sell 525 tickets and collect \$2876. How many of each type of ticket did you sell?

Let  $s = \#$  of student tickets  
 $g = \#$  of gen. adm tickets

$$\begin{cases} (525 = s + g) \cdot 4 \\ \$2876 = 4s + 6g \end{cases}$$

$$\begin{array}{r} -2100 = -4s - 4g \\ + 2876 = 4s + 6g \\ \hline 776 = 2g \end{array}$$

$$\begin{aligned} 525 - 388 &= s \\ 137 &= s \end{aligned}$$

388 gen adm tickets and 137 student tickets were sold.

#### Example 2

Tanner saves nickels and dimes for tolls. If Tanner has 28 coins worth \$2.60, how many are nickels and how many are dimes?

Let  $n = \#$  of nickels  
 $d = \#$  of dimes

$$\begin{cases} (28 = n + d) \cdot 1 \\ \$2.60 = .05n + .10d \end{cases}$$

$$\begin{array}{r} -2.80 = -.1n - 1d \\ \hline -.20 = -.05n \\ n = 4 \end{array}$$

$$\begin{aligned} 28 - 4 &= d \\ 24 &= d \end{aligned}$$

Tanner had 4 nickels & 24 dimes.

#### Example 3

Jesse and Jake bought food for a long hike. Jesse got 4 apples and 2 sandwiches for \$16.18. Jake got 3 sandwiches and 3 apples for \$19.02. How much does each sandwich and each apple cost?

Let  $a = \text{cost of an apple}$   
 $s = \text{cost of a sandwich}$

$$\begin{cases} (19.02 = 3a + 3s) \cdot 2 \\ (16.18 = 4a + 2s) \cdot 3 \end{cases}$$

$$\begin{array}{r} -38.04 = -6a - 6s \\ + 48.54 = 12a + 6s \\ \hline 10.5 = 6a \end{array}$$

Apples cost \$1.75 each & sandwiches cost \$4.59 each.

$$\begin{aligned} 10.5 &= 6a \\ a &= 1.75 \end{aligned}$$

$$\begin{aligned} 4(1.75) + 2s &= 16.18 \\ 7 + 2s &= 16.18 \\ 2s &= 9.18 \\ s &= 4.59 \end{aligned}$$