

**LINEAR WORD PROBLEMS OF ALL TYPES**

1. Mr. Thompson is on a diet. He currently weighs 260 pounds, and loses 4 pounds per month.

**Identify the variables in this situation:**  $x =$  months  $y =$  total weight

**What is the given information in this problem (find all that apply)?**

y-intercept 260 slope -4 Total: \_\_\_\_\_  
 one point ( \_\_\_\_\_ , \_\_\_\_\_ ) a second point: ( \_\_\_\_\_ , \_\_\_\_\_ )

a. Write a linear model that represents Mr. Thompson's weight after  $m$  months.

$$y = -4x + 260$$

b. After how many months will Mr. Thompson reach his goal weight of 220 pounds?

$$\begin{array}{r} 220 \\ -260 \\ \hline -40 \\ -4 \\ \hline 10 = x \end{array} \quad \begin{array}{r} -4x + 260 \\ -260 \\ \hline -4x \\ -4 \\ \hline 10 = x \end{array}$$

Mr. Thompson will weigh 220 pounds after 10 months.

2. At a school play, children's tickets cost \$3 each and adult tickets cost \$7 each. The total amount of money earned from ticket sales equals \$210.

**Identify the variables in this situation:**  $x =$  children's tickets  $y =$  adult tickets

**What is the given information in this problem (find all that apply)?**

y-intercept \_\_\_\_\_ slope \_\_\_\_\_ Total: 210  
 one point ( \_\_\_\_\_ , \_\_\_\_\_ ) a second point: ( \_\_\_\_\_ , \_\_\_\_\_ )

a. Write a linear model that relates the number of children's tickets sold to the number of adult tickets sold.

$$3x + 7y = 210$$

b. How many children's tickets were sold if 24 adult tickets were sold?

$$\begin{array}{r} 3x + 7(24) = 210 \\ 3x + 168 = 210 \\ -168 \quad -168 \\ \hline 3x = 42 \\ \frac{3x}{3} = \frac{42}{3} \\ x = 14 \end{array}$$

There were 14 children's tickets sold.

3. At age 12 Patrick weighed 43 kg; at age 14 he weighed 50 kg. Patrick's age and weight are related.

Identify the variables in this situation:  $x =$  age  $y =$  weight

What is the given information in this problem (find all that apply)?

y-intercept \_\_\_\_\_ slope \_\_\_\_\_ Total: \_\_\_\_\_

one point ( 12 , 43 ) a second point: ( 14 , 50 )

a. Write a linear model relating Patrick's weight to his age.

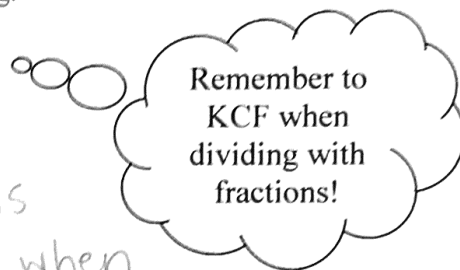
$$m = \frac{50 - 43}{14 - 12} = \frac{7}{2}$$

$$y - 43 = \frac{7}{2}(x - 12)$$

b. Use your equation to find out Patrick's age when he weighed 29 kg.

$$\begin{array}{r} 29 - 43 = \frac{7}{2}(x - 12) \\ -14 = \frac{7}{2}x - 42 \\ +42 \qquad \qquad +42 \\ \hline \left(\frac{2}{7}\right)28 = \frac{7}{2}x \left(\frac{2}{7}\right) \\ 8 = x \end{array}$$

Patrick was  
8 years old when  
he weighed 29 kg.



4. Ben walks at a rate of 3 miles per hour. He runs at a rate of 6 miles per hour. In one week, the combined distance that he walks and runs is 210 miles.

Identify the variables in this situation:  $x =$  walking rate  $y =$  running rate

What is the given information in this problem (find all that apply)?

y-intercept \_\_\_\_\_ slope \_\_\_\_\_ Total: 210

one point ( \_\_\_\_\_ , \_\_\_\_\_ ) a second point: ( \_\_\_\_\_ , \_\_\_\_\_ )

a. Write a linear model that relates the number of hours that Ben walks to the number of hours Ben runs.

$$3x + 6y = 210$$

b. Ben runs for 25 hours. For how many hours does he ~~run~~<sup>walk?</sup>?

$$3x + 6(25) = 210$$

$$3x + 150 = 210$$

$$-150 \quad -150$$

$$\frac{3x}{3} = \frac{60}{3}$$

$$x = 20$$

Ben walks for 20 hours.