

LINEAR WORD PROBLEMS

Sometimes there is no slope given or there *appears* to be 2 slopes! These two numbers are the number per x and the number per y . Each of these is multiplied to x and y , respectively. There is no beginning amount, nor are there points given. However, there may be a TOTAL involved. In this case, the equation can be written in $Ax + By = C$ form with C being the total amount. *Neither variable is dependent on the other in this case!*

1. A 100-point test has x questions worth 2 points apiece and y questions worth 4 points apiece. What do the variables stand for:

$x =$ 2 pt. quest. $y =$ 4 pt. quest. What is the total? 100

- a. Write an equation that describes all possible numbers of questions that may be on the test.

$$2x + 4y = 100$$

- b. If you have 24 questions worth 4 points apiece how many questions will be worth 2 points apiece?

$$\begin{array}{r} 2x + 4(24) = 100 \\ 2x + 96 = 100 \\ \underline{-96 \quad -96} \\ 2x = 4 \\ \frac{2x}{2} = \frac{4}{2} \\ x = 2 \end{array}$$

2. Louise has \$36 in five-dollar bills and singles. How many of each type of bill does she have? What do the variables stand for:

$x =$ \$5 bills $y =$ \$1 bills What's the total? 36

2 - 2pt quest

- a. Write an equation. $5x + 1y = 36$ or $5x + y = 36$

- b. If Louise has 2 five-dollar bills how many singles does she have?

$$\begin{array}{r} 5(2) + y = 36 \\ 10 + y = 36 \\ \underline{-10 \quad -10} \\ y = 26 \end{array}$$

26 \$1 bills

3. The Ramy family bought 4 sandwiches and 3 salads. They spent \$24. Let x be the cost of a sandwich and y be the cost of a salad.

What do the variables stand for:

$x =$ cost sandwich $y =$ cost salad What is the total? 24

- a. Write an equation. $4x + 3y = 24$

- b. If each sandwich costs \$3.75 how much did each salad cost?

$$4(3.75) + 3y = 24 \quad y = 3$$

$$\begin{array}{r} 15 + 3y = 24 \\ \underline{-15 \quad -15} \\ 3y = 9 \\ \frac{3y}{3} = \frac{9}{3} \\ y = 3 \end{array}$$

\$3 per salad

$$m = \frac{21 - 14}{10 - 5} = \frac{7}{5}$$

$$y - 14 = \frac{7}{5}(x - 5)$$

$$y - 14 = \frac{7}{5}x - 7$$

$$\begin{array}{r} +14 \\ \hline \end{array}$$

$$y = \frac{7}{5}x + 7$$

(5, 14)

Y X

(10, 21)

Y X

4. A baby weighs 14 pounds at 5 months and 21 pounds at 10 months.

a. Write an equation in slope-intercept form that relates the baby's weight, y , to the baby's age, x .

x - months

y - weight

$$y = \frac{7}{5}x + 7$$

b. Use your equation to find how much the baby weighed at birth. ← 0 months

$$y = \frac{7}{5}(0) + 7$$

$$y = 7$$

7 lbs

c. How many pounds did the baby gain each month after in its first year?

$\frac{7}{5}$ lbs

d. How much did the baby gain in its first year?

1 yr = 12 months

$$y = \frac{7}{5}(12) + 7$$

$$y = \frac{84}{5} + 7$$

$$y = \frac{84}{5} + \frac{35}{5}$$

$$y = \frac{119}{5}$$

$$y = 23.8$$

$$\begin{array}{r} 23.8 \\ - 7 \\ \hline 16.8 \end{array}$$

The baby gained 16.8 lbs in its first year.