Algebra Word Problems Name _____

Basic Word Problems:

Example

The bookstore ordered boxes of pencils for resale. The cost of the pencils was $2.25 per box and the shipping cost of the order was $6.80. If the total cost of the pencils and shipping was $33.80, how many boxes of pencils were ordered?

$2.25 \cdot b + 6.80 = 33.80$

Let b = boxes of pencils

$-6.80 \quad -6.80$

$\frac{2.25b}{2.25} = \frac{27}{2.25}$

$b = 12$

12 boxes of pencils

A rental company rents a luxury car at a daily rate of $38.34 plus $.50 per mile. Paul is allotted $100 for car rental each day. Write and solve an equation to determine the maximum number of whole miles Paul can travel.

An athlete runs an equal distance 4 days a week. The other 3 days of the week, she runs a total of 11 miles. If the athlete ran 43 miles last week, how far did she run each of the first 4 days?

Variables on Both Sides

Example

Container A has 200 L of water, and is being filled at a rate of 6 liters per minute. Container B has 500 L of water, and is being drained at 6 liters per minute. How many minutes will it take for the two containers to have the same amount of water?

Container A = Container B Let m = minutes

$200 + 6m = 500 - 6m$

$+6m \quad +6m$

$200 + 12m = 500$

$-200 \quad -200$

$\frac{12m}{12} = \frac{300}{12}$

$m = 25$ minutes

A town's population is 43,425. About 125 people move out of the town each month. Each month, 200 people on average move into town. A nearby town has a population of 45,000. It has no one moving in and an average of 150 people moving away every month. In about how many months will the populations of the towns be equal?

One telephone company charges $16.25 per month and $0.05 per minute for local calls. Another company charges $22.95 per month and $0.02 per minute for local calls. For what number of minutes of local calls per month is the cost of the plans the same?

I'm Thinking of a Number...

Example

Ms. Farrence is thinking of three numbers. The second number is twice the first. The third number is $\frac{1}{3}$ the first. The sum of the numbers is 40. Find the numbers.

$x + 2x + \frac{1}{3}x = 40$

$3\frac{1}{3}x = 40$

$\frac{3}{10} \cdot \frac{10}{3}x = \frac{4}{40} \cdot \frac{3}{10_1}$

$x = 12$

Let x = 1st #

Let $2x$ = 2nd #

Let $\frac{1}{3}x$ = 3rd #

1st # = 12

2nd # = 24

3rd # = 4

Helen has a basket of apples. Bob has $\frac{2}{3}$ the amount of apples in his basket. If the difference in the amount of apples in their baskets is 9, find the amount of apples Helen and Bob have in their baskets.

Three friends received their test scores. Molly's score was 10 points higher than Steve's score. Karen's score was 5 points less than Steve's score. The sum of their test scores was 245. Find each friends test score.

Perimeter Problems

Example

The width of a rectangle is 6 cm less than the length. The perimeter is 72 cm. Write and solve an equation to find the dimensions of the rectangle.

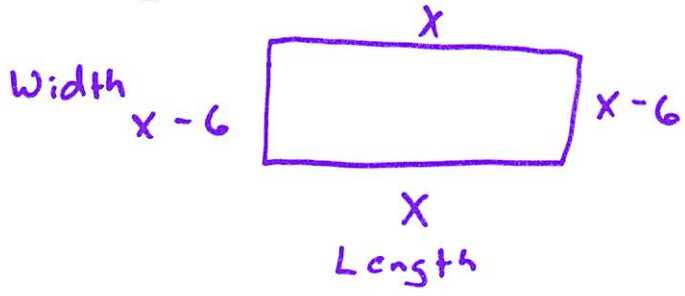
$x - 6 + x + x - 6 + x = 72$

$4x - 12 = 72$

$+12 \quad +12$

$\frac{4x}{4} = \frac{84}{4}$

$x = 21$



Width = 21 − 6 = 15 cm

Length = 21 cm

The length of the base of an isosceles triangle is 10 less than twice the length of one of its legs. If the perimeter of the triangle is 50, find the length of the base of the triangle.

The length of a rectangle is 4 in. greater than the half the width. The perimeter of the rectangle is 26 in. Find the dimensions of the rectangle.

Consecutive Integers Problems

Example

The sum of four consecutive odd integers is 216. Find the four integers.

Let x = 1st odd

Let $x+2$ = 2nd Odd

Let $x+4$ = 3rd Odd

Let $x+6$ = 4th Odd

$x + x+2 + x+4 + x+6 = 216$

$4x + 12 = 216$

$-12 \quad -12$

$4x = 204$

$x = 51$

51, 53, 55, 57

Find three consecutive integers whose sum is -12.

Find three consecutive integers such that the sum of twice the smallest and 3 times the largest is 126.

Ratio Problems

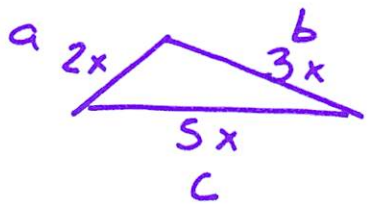
Example

The perimeter of a triangle with sides a, b, and c is 24 cm. The ratio of the lengths of sides a to b to c is 2:3:5. Find the lengths of each side of the triangle.

$2x + 3x + 5x = 24$

$\frac{10x}{10} = \frac{24}{10}$

$x = 2.4$



Sides..

$a = 2(2.4) = 4.8$ cm

$b = 3(2.4) = 7.2$ cm

$c = 5(2.4) = 12$ cm

The ratio of the number of girls to the number of boys in a certain mathematics class is 3:5. If there is a total of 32 students in the class, how many are girls and how many are boys?

Donna wants to make trail mix made up of almonds, walnuts and raisins. She wants to mix one part almonds, two parts walnuts, and three parts raisins. Almonds cost \$12 per pound, walnuts cost \$9 per pound, and raisins cost \$5 per pound. Donna has \$15 to spend on the trail mix. Determine how many pounds of trail mix she can make.

A rental company rents a luxury car at a daily rate of $38.34 plus $.50 per mile. Paul is allotted $100 for car rental each day. Write and solve an equation to determine the maximum number of whole miles Paul can travel.

Let m = miles per day

$38.34 + 0.50m = 100

$-38.34 \quad -38.34$

$0.50m = 61.66$

$\frac{0.50m}{0.50} = \frac{61.66}{0.50}$

$m = 123.32$

Paul can travel only 123 miles

An athlete runs an equal distance 4 days a week. The other 3 days of the week, she runs a total of 11 miles. If the athlete ran 43 miles last week, how far did she run each of the first 4 days?

Let r = miles run on each of first 4 days

$$4r + 11 = 43$$

$$-11 \quad -11$$

$$\frac{4r}{4} = \frac{32}{4}$$

$$r = 8 \text{ miles}$$

A town's population is 43,425. About 125 people move out of the town each month. Each month, 200 people on average move into town. A nearby town has a population of 45,000. It has no one moving in and an average of 150 people moving away every month. In about how many months will the populations of the towns be equal?

Let m = months

Town A = Town B

$43425 - 125m + 200m = 45000 - 150m$

$43425 + 75m = 45000 - 150m$

$+150m \qquad +150m$

$43425 + 225m = 45000$

$-43425 \qquad -43425$

$\frac{225m}{225} = \frac{1575}{225}$

$m = 7$ months

One telephone company charges $16.25 per month and $0.05 per minute for local calls. Another company charges $22.95 per month and $0.02 per minute for local calls. For what number of minutes of local calls per month is the cost of the plans the same?

Let c = calls per month

Phone Comp A = Phone Comp B

$16.25 + 0.05c = 22.95 + 0.02c$

$-0.02c \qquad -0.02c$

$16.25 + 0.03c = 22.95$

$-16.25 \qquad -16.25$

$\frac{0.03c}{0.03} = \frac{6.7}{0.03}$

$c = 223.\overline{3}$ minutes

Helen has a basket of apples. Bob has $\frac{2}{3}$ the amount of apples in his basket. If the difference in the amount of apples in their baskets is 9, find the amount of apples Helen and Bob have in their baskets.

Let h = Helen's Apples

Let $\frac{2}{3}h$ = Bob's Apples

$$h - \frac{2}{3}h = 9$$

$$3 \cdot \frac{1}{3}h = 9 \cdot 3$$

$$h = 27$$

Helen has 27 Apples

Bob has $\frac{2}{3}(27) = 18$ Apples

Three friends received their test scores. Molly's score was 10 points higher than Steve's score. Karen's score was 5 points less than Steve's score. The sum of their test scores was 245. Find each friends test score.

Let t = Steve's Score

Let $t+10$ = Molly's Score

Let $t-5$ = Karen's Score

$$t + t+10 + t - 5 = 245$$

$$3t + 5 = 245$$
$$-5 \quad -5$$

$$\frac{3t}{3} = \frac{240}{3}$$

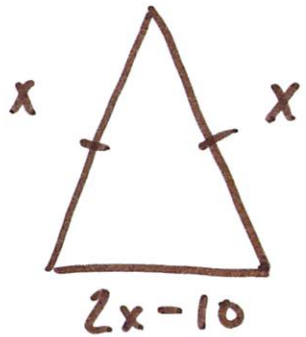
$$t = 80$$

Steve = 80

Molly = 90

Karen = 75

The length of the base of an isosceles (2 sides =) triangle is 10 less than twice the length of one of its legs. If the perimeter of the triangle is 50, find the length of the base of the triangle.



$$x + x + 2x - 10 = 50$$

$$4x - 10 = 50$$
$$+10 \quad +10$$

$$\frac{4x}{4} = \frac{60}{4}$$

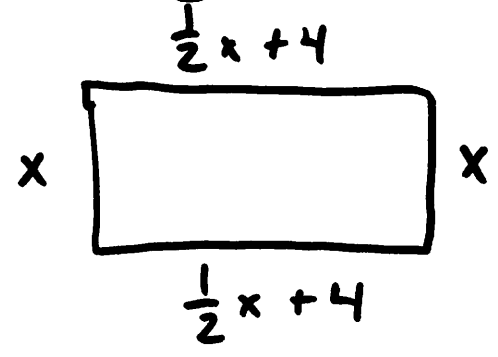
$$x = 15$$

Base $= 2(15) - 10$

$= 20$

The length of a rectangle is 4 in. greater than the half the width. The perimeter of the rectangle is 26 in. Find the dimensions of the rectangle.

$$x + \frac{1}{2}x+4 + x + \frac{1}{2}x+4 = 26$$



$$3x+8 = 26$$
$$-8 \quad -8$$

$$\frac{3x}{3} = \frac{18}{3}$$

$$x = 6$$

width = 6 in

length = $\frac{1}{2}(6)+4 = 7$ in

Find three consecutive integers whose sum is -12.

Let x = 1st Int.

Let $x+1$ = 2nd Int.

Let $x+2$ = 3rd Int.

$$x + x+1 + x+2 = -12$$

$$3x+3 = -12$$
$$-3 \quad -3$$

$$\frac{3x}{3} = \frac{-15}{3}$$

$$x = -5$$

3 Consecutive Integers

$-5, -4, -3$

Find three consecutive integers such that the sum of twice the smallest and 3 times the largest is 126.

$2x + 3(x+2) = 126$

Let x = 1st Int

Let $x+1$ = 2nd Int

Let $x+2$ = 3rd Int

$2x + [3(x+2)] = 126$

$2x + 3x + 6 = 126$

$5x + 6 = 126$

$-6 \quad -6$

$\frac{5x}{5} = \frac{120}{5}$

$x = 24$

3 Consecutive integers

24, 25, 26

The ratio of the number of girls to the number of boys in a certain mathematics class is 3:5. If there is a total of 32 students in the class, how many are girls and how many are boys?

Let $3x$ = girls

Let $5x$ = boys

$$3x + 5x = 32$$

$$\frac{8x}{8} = \frac{32}{8}$$

$$x = 4$$

Girls = 12

Boys = 20

Donna wants to make trail mix made up of almonds, walnuts and raisins. She wants to mix one part almonds, two parts walnuts, and three parts raisins. Almonds cost $12 per pound, walnuts cost $9 per pound, and raisins cost $5 per pound. Donna has $15 to spend on the trail mix. Determine how many pounds of trail mix she can make.

Let ...

Almonds : Walnuts : Raisins

$1x : 2x : 3x$

Where x = lbs of each

$12(1x) + 9(2x) + 5(3x) = 15$

$12x + 18x + 15x = 15$

$\frac{45x}{45} = \frac{15}{45}$

$x = \frac{1}{3}$

$1\left(\frac{1}{3}\right) + 2\left(\frac{1}{3}\right) + 3\left(\frac{1}{3}\right)$

$\frac{1}{3} + \frac{2}{3} + 1 =$ **2 pounds of Trail Mix**