

1. Two numbers have a sum of 1,212 and a difference of 518. What are the two numbers?
2. The sum of the ages of two brothers is 46. The younger brother is 10 more than a third of the older brother's age. How old is the younger brother?
3. One angle measures 54 more degrees than 3 times another angle. The angles are supplementary. What are their measures?
4. Some friends went to the local movie theater and bought four buckets of large popcorn and six boxes of candy. The total for the snacks was \$46.50. The last time you were at the theater, you bought a large popcorn and a box of candy and the total was \$9.75. How much would 2 large buckets of popcorn and 3 boxes of candy cost?
5. You have 59 total coins for a total of \$12.05. You only have quarters and dimes. How many of each coin do you have?
6. A piece of string is 112 inches long. Isabel wants to cut it into 2 pieces so that one piece is three times as long as the other. How long is each piece?

1. Small boxes contain DVDs, and large boxes contain one gaming machine. Three boxes of gaming machines and a box of DVDs weigh 48 pounds. Three boxes of gaming machines and five boxes of DVDs weigh 72 pounds. How much does each box weigh?

Let x represent the weight of the gaming machine box, and let y represent the weight of the DVD box. Then,

$$\begin{cases} 3x + y = 48 \\ 3x + 5y = 72 \end{cases}$$

$$-1(3x + y = 48)$$

$$-3x - y = -48$$

$$\begin{cases} -3x - y = -48 \\ 3x + 5y = 72 \end{cases}$$

$$3x - 3x + 5y - y = 72 - 48$$

$$4y = 24$$

$$y = 6$$

$$3x + 6 = 48$$

$$3x = 42$$

$$x = 14$$

The solution is $(14, 6)$

$$3(14) + 6 = 48$$

$$48 = 48$$

The box with one gaming machine weighs 14 pounds, and the box containing DVDs weighs 6 pounds.

2. A language arts test is worth 100 points. There are a total of 26 questions. There are spelling word questions that are worth 2 points each and vocabulary word questions worth 5 points each. How many of each type of question is there?

Let x represent the number of spelling word questions, and let y represent the number of vocabulary word questions.

$$\begin{cases} x + y = 26 \\ 2x + 5y = 100 \end{cases}$$

$$-2(x + y = 26)$$

$$-2x - 2y = -52$$

$$\begin{cases} -2x - 2y = -52 \\ 2x + 5y = 100 \end{cases}$$

$$2x - 2x + 5y - 2y = 100 - 52$$

$$3y = 48$$

$$y = 16$$

$$x + 16 = 26$$

$$x = 10$$

The solution is $(10, 16)$.

$$10 + 16 = 26$$

$$26 = 26$$

There are 10 spelling word questions and 16 vocabulary word questions.

1. Two numbers have a sum of 1,212 and a difference of 518. What are the two numbers?

Let x represent one number and y represent the other number.

$$\begin{cases} x + y = 1212 \\ x - y = 518 \end{cases}$$

$$x + y + x - y = 1212 - 518$$

$$2x = 694$$

$$x = 347$$

$$347 + y = 1212$$

$$y = 865$$

The solution is (347, 865).

$$347 + 865 = 1212$$

$$1212 = 1212$$

The two numbers are 347 and 865.

2. The sum of the ages of two brothers is 46. The younger brother is 10 more than a third of the older brother's age. How old is the younger brother?

Let x represent the age of the younger brother and y represent the age of the older brother.

$$\begin{cases} x + y = 46 \\ x = 10 + \frac{1}{3}y \end{cases}$$

$$10 + \frac{1}{3}y + y = 46$$

$$10 + \frac{4}{3}y = 46$$

$$\frac{4}{3}y = 36$$

$$y = 27$$

$$x + 27 = 46$$

$$x = 19$$

The solution is (19, 27).

$$19 = 10 + \frac{1}{3}(27)$$

$$19 = 10 + 9$$

$$19 = 19$$

The younger brother is 19 years old.

3. One angle measures 54 more degrees than 3 times another angle. The angles are supplementary. What are their measures?

Let x represent the measure of one angle and y represent the measure of the other angle.

$$\begin{cases} x = 3y + 54 \\ x + y = 180 \end{cases}$$

$$3y + 54 + y = 180$$

$$4y + 54 = 180$$

$$4y = 126$$

$$y = 31.5$$

$$x = 3(31.5) + 54$$

$$x = 94.5 + 54$$

$$x = 148.5$$

The solution is $(31.5, 148.5)$.

$$148.5 + 31.5 = 180$$

$$180 = 180$$

One angle measures 148.5° , and the other measures 31.5° .

4. Some friends went to the local movie theater and bought four buckets of large popcorn and six boxes of candy. The total for the snacks was \$46.50. The last time you were at the theater, you bought a large popcorn and a box of candy and the total was \$9.75. How much would 2 large buckets of popcorn and 3 boxes of candy cost?

Let x represent the cost of a large bucket of popcorn and y represent the cost of a box of candy.

$$\begin{cases} 4x + 6y = 46.50 \\ x + y = 9.75 \end{cases}$$

$$-4(x + y = 9.75)$$

$$-4x - 4y = -39$$

$$\begin{cases} 4x + 6y = 46.50 \\ -4x - 4y = -39 \end{cases}$$

$$4x + 6y - 4x - 4y = 46.50 - 39$$

$$6y - 4y = 7.50$$

$$2y = 7.50$$

$$y = 3.75$$

$$x + 3.75 = 9.75$$

$$x = 6$$

The solution is $(6, 3.75)$.

$$4(6) + 6(3.75) = 46.50$$

$$24 + 22.50 = 46.50$$

$$46.50 = 46.50$$

Two large buckets of popcorn and three boxes of candy will cost $2(6) + 3(3.75) = 12 + 11.25 = 23.25$ dollars.

5. You have 59 total coins for a total of \$12.05. You only have quarters and dimes. How many of each coin do you have?

Let x represent the number of quarters and y represent the number of dimes.

$$\begin{cases} x + y = 59 \\ 0.25x + 0.1y = 12.05 \end{cases}$$

$$\begin{aligned} -4(0.25x + 0.1y = 12.05) \\ -x - 0.4y = -48.20 \end{aligned}$$

$$\begin{cases} x + y = 59 \\ -x - 0.4y = -48.20 \end{cases}$$

$$x + y - x - 0.4y = 59 - 48.20$$

$$y - 0.4y = 10.80$$

$$0.6y = 10.80$$

$$y = \frac{10.80}{0.6}$$

$$y = 18$$

$$x + 18 = 59$$

$$x = 41$$

The solution is (41, 18).

$$0.25(41) + 0.1(18) = 12.05$$

$$10.25 + 1.80 = 12.05$$

$$12.05 = 12.05$$

I have 41 quarters and 18 dimes.

6. A piece of string is 112 inches long. Isabel wants to cut it into 2 pieces so that one piece is three times as long as the other. How long is each piece?

Let x represent one piece and y represent the other.

$$\begin{cases} x + y = 112 \\ 3y = x \end{cases}$$

$$3y + y = 112$$

$$4y = 112$$

$$y = 28$$

$$x + 28 = 112$$

$$x = 84$$

The solution is (84, 28).

$$84 + 28 = 112$$

$$112 = 112$$

One piece should be 84 inches long, and the other should be 28 inches long.