

## System of Equations (Word Problems)

1. Some friends went to the local movie theater and bought four large buckets of 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 bucket of 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?

2. 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?

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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).

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

$$24 + 22.50 = 46.50$$

$$46.50 = 46.50$$

Since one large bucket of popcorn costs \$6 and one box of candy costs \$3.75, then  $2(6) + 3(3.75) = 12 + 11.25 = 23.25$ , and two large buckets of popcorn and three boxes of candy will cost \$23.25.

2. 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.

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

$$-4(0.25x + 0.1y = 12.05)$$

$$-x - 0.4y = -48.20$$

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

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

$$y - 0.4y = 10.80$$

$$0.6y = 10.80$$

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

$$y = 18$$

$$x + 18 = 59$$

$$x = 41$$

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.