

Worksheet: Solving word problems using systems of equations (part 2). Identify your variables, set up a system of equations, and solve for your variables.

1. The cost of 5 squash and 2 zucchini is \$1.32. Three squash and 1 zucchini cost \$0.75. Find the cost of each vegetable.

$$\begin{aligned} 5x + 2y &= 1.32 \rightarrow 5x + 2y = 1.32 \\ 2(3x + 1y &= 0.75) \cdot 2 \rightarrow 6x + 2y = 1.50 \\ \hline & -x &= & -0.18 \\ \hline & x &= & 0.18 \end{aligned}$$

$$\begin{aligned} 5(0.18) + 2y &= 1.32 \\ 0.90 + 2y &= 1.32 \\ -0.90 & -0.90 \\ \hline 2y &= 0.42 \\ y &= 0.21 \end{aligned}$$

2. Judy worked 8 hours and Ben worked 10 hours. Their combined pay was \$80. When Judy worked 9 hours and Ben worked 5 hours, their combined pay was \$65. Find the hourly rate of pay for each person.

$$\begin{aligned} 8x + 10y &= 80 \rightarrow 8x + 10y = 80 \\ 2(9x + 5y &= 65) \cdot 2 \rightarrow 18x + 10y = 130 \\ \hline & -10x &= & -50 \\ \hline & -2x &= & -30 \\ \hline & x &= & 15 \end{aligned}$$

$$\begin{aligned} 8(5) + 10y &= 80 \\ 40 + 10y &= 80 \\ -40 & -40 \\ \hline 10y &= 40 \\ y &= 4 \end{aligned}$$

3. Rob has 40 coins, all dimes and quarters, worth \$7.60. How many dimes and how many quarters does he have?

$$\begin{aligned} x + y &= 40 \rightarrow x + y = 40 \\ 10(0.10x + 0.25y &= 7.60) \cdot 10 \rightarrow x + 2.5y = 76 \\ \hline & -x &= & -24 \\ \hline & 1.5y &= & 36 \\ \hline & y &= & 24 \end{aligned}$$

$$\begin{aligned} x + 24 &= 40 \\ -24 & -24 \\ \hline x &= 16 \end{aligned}$$

4. Kelly has 24 dimes and quarters worth \$3.60. How many quarters does she have?

$$\begin{aligned} x + y &= 24 \rightarrow x + y = 24 \\ 10(0.10x + 0.25y &= 3.60) \cdot 10 \rightarrow x + 2.5y = 36 \\ \hline & -x &= & -12 \\ \hline & 1.5y &= & 12 \\ \hline & y &= & 8 \end{aligned}$$

$$\begin{aligned} x + 8 &= 24 \\ -8 & -8 \\ \hline x &= 16 \end{aligned}$$

8 quarters

5. The talent show committee sold a total of 530 tickets in advance. Student tickets cost \$3 each and the adult tickets cost \$4 each. If the total receipts were \$1740, how many of each type of ticket were sold? $x = \text{student}$, $y = \text{adult}$

$$\begin{aligned} 3(x + y &= 530) \cdot 3 \rightarrow 3x + 3y = 1590 \\ 3x + 4y &= 1740 \rightarrow 3x + 4y = 1740 \\ \hline & -y &= & -150 \\ \hline & y &= & 150 \end{aligned}$$

$$\begin{aligned} x + 150 &= 530 \\ \hline x &= 380 \end{aligned}$$

6. The length of a rectangle is 4cm longer than the width. The perimeter is 80 cm. Find the length and the width.

$$\begin{aligned}
 x &= y + 4 \rightarrow 2(x - y = 4) \rightarrow 2x - 2y = 8 \\
 2x + 2y &= 80 \rightarrow 2x + 2y = 80 \\
 \hline
 & \quad \quad \quad 4x = 88 \\
 & \quad \quad \quad \frac{4}{4} \quad \frac{88}{4} \\
 & \quad \quad \quad x = 22
 \end{aligned}$$

$$22 = y + 4$$

$$18 = y$$

7. A collection of nickels and quarters is worth \$2.85. There are 3 more nickels than quarters. How many nickels and quarters are there?

$$4 \cdot (.05x + .25y = 2.85) \rightarrow .20x + y = 11.4$$

$$x = y + 3 \rightarrow x - y = 3$$

$$\begin{aligned}
 1.2x &= 14.4 \\
 \frac{1.2}{1.2} & \quad \frac{14.4}{1.2} \\
 x &= 12
 \end{aligned}$$

$$12 = y + 3$$

$$9 = y$$

8. Ann and Betty together have \$60. Ann has \$9 more than twice Betty's amount. How much money does each have?

$$x + y = 60 \rightarrow x + y = 60$$

$$x = 2y + 9 \rightarrow x - 2y = 9$$

$$\begin{aligned}
 3y &= 69 \\
 \frac{3}{3} & \quad \frac{69}{3} \\
 y &= 23
 \end{aligned}$$

$$x + 23 = 60$$

$$x = 37$$

9. A bowl contained 13 red and brown M&M's. There was one more red M&M's than brown M&M's. How many of each color are in the bowl?

$$x + y = 13 \rightarrow x + y = 13$$

$$x = y + 1 \rightarrow x - y = 1$$

$$2x = 14$$

$$x = 7$$

$$7 + y = 13$$

$$y = 6$$

10. A movie theater charges \$5 for an adult's ticket and \$2 for a child's ticket. One Saturday, the theater sold 785 tickets for \$3280. How many of each type of ticket were sold?

$$5x + 2y = 3280 \rightarrow 5x + 2y = 3280$$

$$2(x + y = 785) \rightarrow 2x + 2y = 1570$$

$$\begin{aligned}
 3x &= 1710 \\
 \frac{3}{3} & \quad \frac{1710}{3} \\
 x &= 570
 \end{aligned}$$

$$5(70) + y = 785$$

$$y = 215$$