

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.

S = # cost of 1 squash

Z = cost of 1 zucchini

$$\begin{aligned} 5s + 2z &= 1.32 \\ 2(3s + 1z &= 0.75) \rightarrow -6s - 2z = -1.50 \end{aligned}$$

$$\begin{aligned} 5s + 2z &= 1.32 \\ -6s - 2z &= -1.50 \\ \hline -s &= -0.18 \\ s &= 0.18 \end{aligned}$$

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

Each squash costs \$0.18 and each zucchini is \$0.21

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.

J = Judy's hourly rate
 B = Ben's hourly rate

$$\begin{aligned} 8J + 10B &= 80 \\ 9J + 5B &= 65 \end{aligned}$$

$$\begin{aligned} 8J + 10B &= 80 \\ -8J - 10B &= -130 \\ \hline -10J &= -50 \\ J &= 5 \end{aligned}$$

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

Judy earns \$5/hr and Ben earns \$4/hr

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

D = # of dimes Rob has

Q = # of quarters Rob has

$$\begin{aligned} D + Q &= 40 \\ 0.1D + 0.25Q &= 7.60 \end{aligned}$$

$$\begin{aligned} D + Q &= 40 \\ -D - 2.5Q &= -76.0 \\ \hline -1.5Q &= -36 \\ -1.5 & \quad -1.5 \\ \hline Q &= 24 \end{aligned}$$

$$\begin{aligned} D + 24 &= 40 \\ D &= 16 \end{aligned}$$

Rob had 24 Quarters and 16 dimes.

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

D = # of dimes Kelly has
 Q = # of quarters Kelly has

$$\begin{aligned} 24(0.1) + Q(0.25) &= 3.60 \\ 2.4 + Q(0.25) &= 3.60 \end{aligned}$$

$$\begin{aligned} 24 + 0.25Q &= 36 \\ 0.25Q &= 12 \\ Q &= 48 \end{aligned}$$

$$\begin{aligned} 24 &= Q + D \\ -36 &= -2.5Q + D \\ \hline -12 &= -1.5Q \\ Q &= 8 \end{aligned}$$

$Q = 8$
 $D = 16$

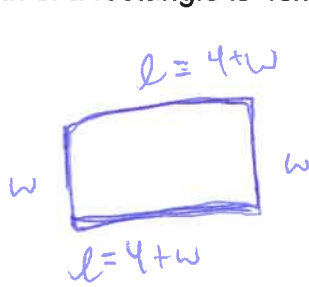
5. The talent show committee sold a total of 530 tickets in advance. Student tickets cost \$3 each and the adult tickets cost \$4 each. If the total receipts were \$1740, how many of each type of ticket were sold?

$$\begin{aligned} 3s + 4a &= 1740 \\ s + a &= 530 \\ \hline -3s - 3a &= -1590 \\ \hline a &= 150 \end{aligned}$$

$$\begin{aligned} 3s + 4(150) &= 1740 \\ 3s + 600 &= 1740 \\ 3s &= 1140 \\ s &= 380 \end{aligned}$$

They sold 380 Student tickets & 150 adult tickets

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



$$\begin{aligned}
 &4+w \quad 4+w \\
 &\downarrow \\
 &l+l+w+w = 80 \\
 &\downarrow \\
 &2l+2w = 80 \\
 &8+4w = 80 \\
 &4w = 72
 \end{aligned}$$

The width of the rectangle is 18cm and the length is 24cm

$w = 18\text{cm} \ \& \ l = 24\text{cm}$

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?

$N = \#$ of nickel
 $Q = \#$ of quarters

$$\begin{aligned}
 3 + N &= Q \\
 (0.05)N + (0.25)Q &= 2.85 \\
 &\text{Substitute!} \\
 .05N + 0.25(3+N) &= 2.85 \\
 .05N + 0.75 + 0.25N &= 2.85
 \end{aligned}$$

$$\begin{aligned}
 0.30N + 0.75 &= 2.85 \\
 \underline{0.30N} &= \underline{2.10} \\
 0.30 & \quad 0.30
 \end{aligned}$$

$N = 7$
 There are 7 Nickels and 10 Quarters

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

$A =$ the amount of money Ann has.
 $B =$ the amount of money Betty has.

$$\begin{aligned}
 A + B &= \$60 \\
 A &= 9 + 2B
 \end{aligned}$$

$$\begin{aligned}
 (9+2B) + B &= 60 \\
 9 + 3B &= 60 \\
 3B &= 51 \\
 B &= 17
 \end{aligned}$$

$$\begin{aligned}
 A &= 9 + 2B \\
 A &= 9 + 2(17) \\
 A &= 9 + 34 = 43
 \end{aligned}$$

Ann has \$43 and Betty has \$17

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?

$R = \#$ of Red M&M's
 $B = \#$ of Brown M&M's
 $R = 1 + B, \ R + B = 13$

$$\begin{aligned}
 (1+B) + B &= 13 \\
 1 + 2B &= 13 \\
 2B &= 12 \\
 B &= 6
 \end{aligned}$$

$$\begin{aligned}
 R + B &= 13 \\
 R + 6 &= 13 \\
 R &= 7
 \end{aligned}$$

There are 7 red M&M's and 6 brown M&M's

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?

$A = \#$ of Adult tickets sold
 $C = \#$ of Child tickets sold

$$\begin{aligned}
 -5(A + C = 785) \\
 5A + 2C = 3280
 \end{aligned}$$

$$\begin{aligned}
 -5A - 5C &= -3925 \\
 \underline{5A + 2C} &= \underline{3280} \\
 -3C &= -645 \\
 \underline{-3} & \quad \underline{-3} \\
 C &= 215
 \end{aligned}$$

$$\begin{aligned}
 A + C &= 785 \\
 A + 215 &= 785 \\
 A &= 570
 \end{aligned}$$

They sold 570 Adult tickets and 215 children tickets