

key

Using Systems of Equations to Solve Real World Problems

Warm Up: Multiple Choice

1. Jane spent \$10 at the ice cream truck. She bought x ice cream cones and y sundaes. The equation below shows the relationship between the number of ice cream cones and the number of sundaes she bought.

$$3x + 4y = 10$$

The ordered pair $(2, 1)$ is a solution of the equation. What does the solution $(2, 1)$ represent?

- A Sundaes cost \$2 each and ice cream cones cost \$1 each.
- B A sundae costs 2 times as much as an ice cream cone.
- C Jane spent \$2 on sundaes and \$1 on ice cream cones.
- D Jane bought 2 ice cream cones and 1 sundae.

2. Ms. Monti bought x adult tickets and y children's tickets to an ice-skating show. She spent a total of \$145. The equation below describes the relationship between x and y .

$$25x + 15y = 145$$

The ordered pair $(4, 3)$ is a solution of the equation. What does the solution $(4, 3)$ represent?

- A Ms. Monti bought 4 adult tickets and 3 children's tickets.
- B Adult tickets cost \$4 each and children's tickets cost \$3 each.
- C Ms. Monti spent \$4 on adult tickets and \$3 on children's tickets.
- D The cost of 4 adult tickets equals the cost of 3 children's tickets.

For each word problem:

- 1.) Define your variables
- 2.) Set up two equations
- 3.) Solve by elimination
- 4.) Explain your answer

Examples:

- 1) Franklin sold water bottles in two sizes, large (\$2.50 each) and regular (\$1 each). He sold 113 bottles altogether and collected \$221 dollars. How many bottles of each type did he sell?

x = # of large water bottles

y = # of regular water bottles

$$\begin{aligned} -1 \quad & (x + y = 113) \\ & 2.50x + y = 221 \end{aligned}$$

$$2.50x + y = 221$$

$$-x - y = -113$$

$$2.5x + y = 221$$

$$\frac{1.5x = 108}{1.5 \quad 1.5}$$

$$x = 72$$

$$x + y = 113$$

$$\cancel{72} + y = 113$$

$$\underline{-72 \quad -72}$$

$$y = 41$$

72 large
41 regular

- 2) Kimberly ran an amusement park with large animals. She charged \$20 for horse rides and \$50 for elephant rides. Fifty-five rides were offered and \$2000 was collected. How many rides of each type were offered?

x = # of horse rides

y = # of elephant rides

$$-20 \quad (x + y = 55)$$

$$20x + 50y = 2000$$

$$\cancel{-20}x - 20y = -1100$$

$$20x + 50y = 2000$$

$$\frac{30y = 900}{30 \quad 30}$$

$$y = 30$$

25 horse rides
30 elephant rides

$$x + y = 55$$

$$x + \cancel{30} = 55$$

$$\underline{-30 \quad -30}$$

$$x = 25$$

3) The Osiris Diamond Company sold two types of diamonds, marquise cut for \$1200 and princess cut for \$1800. It sold seventy-five diamonds during a sales campaign for Christmas. It received \$112,200 in sales. How many diamonds were sold of each type?

$$\begin{aligned}
 x &= \# \text{ of marquise cut} & -1200(x+y=75) \\
 y &= \# \text{ of princess cut} & 1200x+1800y=112,200
 \end{aligned}$$

$$\begin{array}{r}
 -1200x - 1200y = -90000 \\
 1200x + 1800y = 112,200 \\
 \hline
 600y = 22,200 \\
 600 \qquad \qquad 600
 \end{array}$$

$$y = 37$$

$$x + y = 75$$

$$\begin{array}{r}
 x + 37 = 75 \\
 -37 \quad -37 \\
 \hline
 \end{array}$$

$$x = 38$$

38 marquise cut
37 princess cut

4) The sum of two numbers is 18. The sum of the greater number and twice the smaller number is 25. Find the numbers.

$$\begin{aligned}
 x &= \text{greater number} & -1(x+y=18) \\
 y &= \text{smaller number} & x+2y=25
 \end{aligned}$$

$$\begin{array}{r}
 -x - y = -18 \\
 x + 2y = 25 \\
 \hline
 \end{array}$$

$$y = 7$$

The greater number is 11 and the smaller number is 7

$$x + y = 18$$

$$x + 7 = 18$$

$$\begin{array}{r}
 x + 7 = 18 \\
 -7 \quad -7 \\
 \hline
 \end{array}$$

$$x = 11$$

Homework pg: 347 #10, 11 – 19 odd, 20, 30, 31

