

Define variables. Write and solve systems of equations. Do all work on your own paper.

1. The difference between two numbers is 4. Twice the larger number is equal to three times the smaller number increased by 2. Find the numbers.
2. For \$12, you can buy 4 quarts of milk and 4 cartons of eggs or 6 quarts of milk and 3 cartons of eggs. Find the cost of a carton of eggs.
3. The perimeter of a rectangle is 28 inches. The length of the rectangle is 1 inch shorter than twice the width. Find length and width.
4. Mrs. Bryant spent \$36 on 10 boxes of dog treats for her dogs, Tango and Chopper. Gourmet treats cost \$4 per box and store brand treats cost \$3 per box. How many boxes of gourmet treats did she buy?
5. John and Harry together weigh 210 pounds. The difference between three times John's weight and twice Harry's weight is 30 pounds. Find both boys' weights.
6. Two isosceles triangles have equal bases. The legs of one isosceles triangle are twice as long as the legs of the other triangle. The perimeters of the triangles are 21 cm and 37 cm. Find the side lengths of the larger triangle.
7. In a canoe race, a team paddles 480 meters downstream in 60 seconds. The same team makes the return trip upstream in 80 seconds. Find the team's paddling rate (in meters per second) in still water and the rate of the current (in meters per second).
8. Flying against a head wind, a plane traveled 500 km in 5 hours. With a tail wind, the plane flew the return trip in 4 hours and 10 minutes. Find the plane's air speed and the speed of the wind.
(hint: avoid decimals)
9. Together, Ryker, Ava, and Chloe have \$31. Find the amount of money each child has, if Ava has \$3 less than Ryker, and Chloe has \$1 more than Ryker and Ava combined.
10. There are 30 coins in a piggy bank—pennies, nickels, dimes, and quarters—with a total value of \$2.37. There are twice as many pennies as nickels and two more dimes than quarters. How many of each type of coin are there?

Solve each system. Give the answers in (x, y) form.

11.	$\begin{aligned} 2x - 3y &= 3(x + y - 2) \\ 3x - 2y &= 2(x + y - 3) \end{aligned}$	12.	$\begin{aligned} \frac{5x}{4} + y &= \frac{11}{2} \\ x + \frac{y}{3} &= 3 \end{aligned}$	13.	$\begin{aligned} 0.75x + 0.3y &= 4.5 \\ 0.125x + 0.4y &= 2.5 \end{aligned}$
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Solve each system. Give the answers in (x, y) form.

14.
$$\frac{6}{x} + \frac{3}{y} = 2$$
$$\frac{2}{x} - \frac{9}{y} = 4$$

15.
$$\frac{3}{x} + \frac{8}{y} = 1$$
$$\frac{5}{x} + \frac{4}{y} = 1$$

16.
$$\frac{6}{x} + \frac{5}{y} = 1$$
$$\frac{3}{x} - \frac{10}{y} = 3$$

17. Determine A and B so that the graph of the equation $y = Ax^2 + Bx$ will contain the points $(2, 2)$ and $(-3, -18)$.

18. Write the equation of a line in standard form that contains the point $(4, -3)$ and the point of intersection for the lines $2x - 3y = -4$ and $5x + 4y = 13$.

Graph each system in the coordinate plane.

19.
$$x \geq 0$$
$$y \geq 0$$
$$x + y > 1$$
$$4x - y > 5$$

20.
$$|x+1| < 2$$
$$|y+2| < 1$$

Answers:

- 10 and 6
- \$2 per carton
- width = 5 cm, length = 9 cm
- 6 boxes gourmet treats
- John weighs 90 lbs, Harry weighs 120 lbs
- 16 cm, 16 cm, 5 cm
- paddling rate = 7 m/s, current = 1 m/s
- air speed = 110 km/hr, wind speed = 10 km/hr
- Ryker has \$9, Ava has \$6, and Chloe has \$16
- 12 pennies, 6 nickels, 7 dimes, 5 quarters

- $\left(\frac{-6}{5}, \frac{6}{5}\right)$
- $(2, 3)$
- $(4, 5)$
- $(2, -3)$
- $(7, 14)$
- $(3, -5)$
- $A = -1, B = 3$
- $5x + 3y = 11$