

3. Suppose you are starting an office-cleaning service. You have spent \$315 on equipment. To clean an office, you use \$4 worth of supplies. You charge \$25 per office. How many offices must you clean to break even?

Define Variables:

$$O = \# \text{ of offices cleaned}$$
$$S = \# \text{ of office supplies}$$

Equation 1

$$25O - 4S = 315$$

Equation 2

$$O = S$$

Solve

$$25O - 4O = 315$$

$$21O = 315$$

$$O = 15$$

$$S = 15$$

Interpret Solution

cleaned 15 offices  
and used 15 supplies

4. The math club and science club had fundraisers to buy supplies for a hospice. The math club spent \$135 buying six cases of juice and one case of bottled water. The science club spent \$110 buying four cases of juice and two cases of bottled water. How much did a case of juice cost? How much did a case of bottled water cost?

Define Variables:

$$j = \text{cost of case of juice}$$

$$w = \text{cost of case of water}$$

Equation 1

$$6j + 1w = 135$$

Equation 2

$$4j + 2w = 110$$

Solve

$$w = 135 - 6j$$

$$4j + 2(135 - 6j) = 110$$

$$4j + 270 - 12j = 110$$

$$-8j = -160$$

$$j = 20$$

Interpret Solution

juice costs \$20  
water costs \$15

5. A rectangle has a perimeter of 18 inches. A new rectangle is formed by doubling the width  $w$ , and tripling the length  $l$  of the triangle. The new rectangle has a perimeter  $P$  of 46 inches. Find the dimensions of the original rectangle.

Define Variables:

$l$  = length of original rectangle  
 $w$  = width of original rectangle

Equation 1

$$2l + 2w = 18$$

Equation 2

$$2(3l) + 2(2w) = 46$$

Solve

$$2l + 2(4) = 18$$

$$2l = 10$$

$$l = 5$$

$$l = -w + 9$$

$$6(-w + 9) + 4w = 46$$

$$-6w + 54 + 4w = 46$$

$$-2w = -8$$

$$w = 4$$

Interpret Solution

$$l = 5 \text{ in} \quad w = 4 \text{ in}$$



6. A new parking lot has spaces for 450 cars. The ratio of spaces for full-size cars to compact cars is 11 to 4. How many spaces are for full-sized cars? How many spaces are for compact cars?

Define Variables:

$f =$  spaces for full size cars  
 $c =$  spaces for compact cars

Equation 1

$$f + c = 450$$

Equation 2

$$\frac{11}{4} = \frac{f}{c}$$

Solve

$$4f = 11c$$

$$f = 450 - c$$

$$4(450 - c) = 11c$$

$$1800 - 4c = 11c$$

$$1800 = 15c$$

$$c = 120$$

Interpret Solution

$$c = 120 \quad f = 330$$

120 spaces for compact cars  
330 spaces for full size cars

7. The local preschool ordered all new bicycles and tricycles for the new school year. Each bicycle and tricycle is shipped in its own box. Oddly, the manufacturer shipped all the wheels in a separate box. If there are 16 boxes of bicycles/tricycles total and 45 wheels total, how many tricycles were ordered?

Define Variables:

$$b = \text{number of bicycles}$$
$$t = \text{number of tricycles}$$

Equation 1

$$b + t = 16$$

Equation 2

$$2b + 3t = 45$$

Solve

$$b = 16 - t$$
$$2(16 - t) + 3t = 45$$
$$32 - 2t + 3t = 45$$
$$32 + t = 45$$
$$t = 13$$

Interpret Solution

$$t = 13 \quad b = 3$$

13 tricycles and 3 bicycles.

8. Joey was challenged to a half-court shooting competition. For every half-court shot that he makes, he will earn 20 points. For each half-court shot he misses, he will lose 5 points. After 20 half-court shots, Joey has zero points. How many half-court shots did he make?

Define Variables:

$$x = \text{shots made}$$

$$y = \text{shots missed}$$

Equation 1

$$x + y = 20$$

Equation 2

$$20x - 5y = 0$$

Solve

$$x = 20 - y$$

$$20(20 - y) - 5y = 0$$

$$400 - 20y - 5y = 0$$

$$400 = 25y$$

$$y = 16$$

Interpret Solution

16 misses      4 makes

9. At McDonald's, four cheeseburgers and three medium fries have a total of 2290 calories. Six cheeseburgers and two medium fries have 2560 calories. How many calories does each item contain?

Define Variables:

$c$  = calories in a cheeseburger  
 $m$  = calories in a medium fry

Equation 1

$$4c + 3m = 2290$$

Equation 2

$$6c + 2m = 2560$$

Solve

$$\begin{aligned} 4c + 3(350) &= 2290 \\ 4c + 1050 &= 2290 \\ 4c &= 1240 \\ c &= 310 \end{aligned}$$

$$\begin{aligned} 4c &= 2290 - 3m \\ c &= 572.5 - .75m \\ 6(572.5 - .75m) + 2m &= 2560 \\ 3435 - 4.5m + 2m &= 2560 \\ -2.5m &= -875 \\ m &= 350 \end{aligned}$$

Interpret Solution

fries = 350 cal  
 burger = 310 cal

