

1. Find $\frac{2}{9}$ of 450.

Solution: The formula we use is

$$(\text{is}) = (\text{Fraction}) \cdot (\text{of})$$

The fraction and the (of) are given, and so

$$(\text{is}) = \left(\frac{2}{9}\right) \cdot (450) = 100$$

The answer is **100**.

2. $\frac{4}{11}$ of a number is 36. Find the number.

Solution: The formula is

$$(\text{is}) = (\text{Fraction}) \cdot (\text{of})$$

The fraction and the (is) are given, and so we label (of) = x

$$\begin{aligned} 36 &= \frac{4}{11} \cdot x && \text{Solve for } x, \text{ divide by } \frac{4}{11} \\ \frac{36}{\left(\frac{4}{11}\right)} &= x && 36 \cdot \frac{11}{4} = 99 \end{aligned}$$

The answer is **99**. We check: is it true that $\frac{4}{11}$ of 99 is 36? Since $\frac{4}{11}(99) = 36$, our solution is correct.

3. 75 is what fraction of 400?

Solution: The formula is

$$(\text{is}) = (\text{Fraction}) \cdot (\text{of})$$

The (is) and the (of) are given, and so we label the fraction as x . The equation is then

$$\begin{aligned} 75 &= x \cdot 400 && \text{Solve for } x, \text{ divide by } 400 \\ \frac{75}{400} &= x && \text{simplify the result} \\ x &= \frac{3}{16} \end{aligned}$$

The answer is **$\frac{3}{16}$** . We check: is it true that $\frac{3}{16}$ of 400 is 75? Since $\frac{3}{16}(400) = 75$, our solution is correct.

4. The sum of two numbers is 31, their difference is 9. Find these numbers.

Solution: Let us call the smaller number x . Then the larger number is $x + 9$, since the difference between the two numbers is 9. The equation then is

$$\begin{array}{rcll} x & + & x + 9 & = 31 & \text{solve for } x \\ \text{smaller number} & & \text{larger number} & & \\ 2x + 9 & = & 31 & & \text{subtract 9} \\ 2x & = & 22 & & \text{divide by 2} \\ x & = & 11 & & \end{array}$$

Thus the smaller number, labeled x is 11. The larger number was labeled $x + 9$, so it must be $11 + 9 = 20$. Thus the numbers are **11 and 20**. We check: the difference between 20 and 11 is $20 - 11 = 9$, and their sum is indeed $11 + 20 = 31$. Thus our solution is correct.

5. The sum of two numbers is 31, their difference is 41. Find these numbers.

Solution: Let us call the smaller number x . Then the larger number is $x + 41$, since the difference between the two numbers is 41. The equation then is

$$\begin{array}{rcll} x & + & x + 41 & = 31 & \text{solve for } x \\ \text{smaller number} & & \text{larger number} & & \\ 2x + 41 & = & 31 & & \text{subtract 41} \\ 2x & = & -10 & & \text{divide by 2} \\ x & = & -5 & & \end{array}$$

Thus the smaller number, labeled x is -5 . The larger number was labeled $x + 41$, so it must be $-5 + 41 = 36$. Thus the numbers are **-5 and 41**. We check: the difference between 36 and -5 is $36 - (-5) = 41$, and their sum is indeed $36 + (-5) = 31$. Thus our solution is correct.

6. One side of a rectangle is 3 ft shorter than twice the other side. Find the sides if the perimeter is 24 ft.

Solution: Let us denote the shorter side by x . Then the longer side is $2x - 3$. The equation expresses the perimeter.

$$\begin{array}{rcll} 24 & = & 2(x) + 2(2x - 3) & \text{Solve for } x \\ 24 & = & 2x + 4x - 6 & \text{combine like terms} \\ 24 & = & 6x - 6 & \text{add 6} \\ 30 & = & 6x & \text{divide by 6} \\ 5 & = & x & \end{array}$$

Thus the shorter side is 5 ft, and the longer side is $2(5) - 3 = 7$ ft. Thus the answer is: **5 ft by 7 ft**. We check: 7 is indeed 3 less than twice 5, i.e. $7 = 2(5) - 3$ and the perimeter is $2(5) + 2(7) = 24$ ft. Thus our solution is indeed correct.