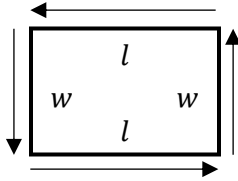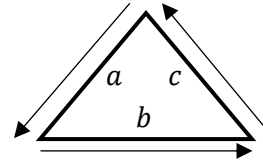# Geometry Exercises
Perimeter

The **perimeter** is the distance around the outside of the figure. Perimeter geometry exercises involve rectangles or triangles.

The formula for finding the perimeter of a rectangle is:
$$P = 2l + 2w$$

Read as "the perimeter is equal to 2 times the length plus 2 times the width."

The formula for finding the perimeter of a triangle is:
$$P = a + b + c$$

Read as "the perimeter is equal to side a plus side b plus side c."

Hint: In writing an equation to solve for the sides of a rectangle or triangle, try to write it in terms of only one variable. Sketch a diagram of the question to help visualize what is needed.

Example: The perimeter of a rectangle is 240 ft. The length of the rectangle is four less than three times the width. Find the length.

Solution:

Step 1: Draw the rectangle and label accordingly. **Note**: that the length is described using the width. *The length is four less than three times the width.* Let the width be the variable.
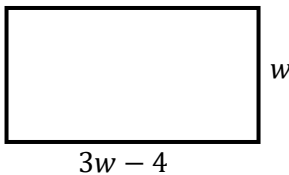
Perimeter = 240 ft.
width = w
length = $3w - 4$ (4 less than 3 times the width)

Step 2: Now substitute the expressions into the equation and solve for w.

$$
\begin{aligned}
P &= 2l + 2w \\
240 &= 2(3w - 4) + 2w \\
240 &= 6w - 8 + 2w \\
240 &= 8w - 8 \\
248 &= 8w \\
31 &= w
\end{aligned}
$$

The width is 31 ft., so the length is:

$$
\begin{aligned}
\textbf{length} &= 3w - 4 \\
&= 3(31) - 4 \\
&= 93 - 4 \\
&= \textbf{89 ft}
\end{aligned}
$$

**Step 3:** Check: $P = 2(31) + 2(89) = 62 + 178 = 240$ ft. ✓

Geometry Exercises
Perimeter

Example: The perimeter of a triangle is 38 ft. The first side is twice the second side. The third side is two feet more than the second side. Find the length of each side.

Solution:

Step 1: Draw the triangle and label accordingly. **Note:** the length is described using the second side. *The first side is twice the second side. The third side is two feet more than the second side.* Let the second side be the variable.
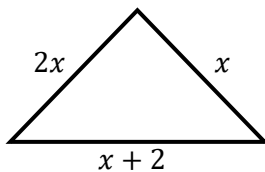
Perimeter $= 38$ ft.
1st side $= 2x$ (twice the 2nd)
2nd side $= x$
3rd side $= x + 2$ (2 ft. more than the 2nd)

Step 2: Now substitute the expressions into the equation and solve.

$$
\begin{aligned}
P &= a + b + c \\
38 &= (2x) + (x) + (x + 2) \\
38 &= 4x + 2 \\
36 &= 4x \\
9 &= x
\end{aligned}
$$

The 2nd side is 9 ft., so the lengths of the sides are:

1st **side** $= 2(9) = 18$ ft.
2nd **side** $= 9$ ft.
3rd **side** $= (9) + 2 = 11$ ft.

Step 3: Check: $P = (18) + (9) + (11) = 38$ ft. ✓

Practice Exercises:

1. The perimeter of a rectangle is 58 m. The width of the rectangle is 5 m less than the length. Find the length and the width of the rectangle.

2. The width of the rectangle is 20% of the length. The perimeter is 240 cm. Find the length and the width of the rectangle.

3. The perimeter of an isosceles triangle is 16 m. The third side is 2 m less than one of the equal sides. Find the length of each side.

4. For a triangle, the first side is twice as long as the second side. The third side is 30 cm longer than the second side. The perimeter is 130 cm. Find the length of each side.

Answers:

1. $l = 17$ m, $w = 12$ m.
2. $l = 100$ cm, $w = 20$ cm.
3. 6 m, 6 m, and 7 m.
4. 50 cm, 25 cm, 55 cm.