

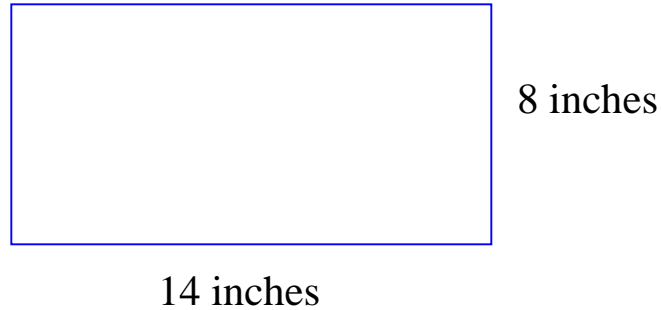
PERIMETER AND AREA OF TRIANGLES AND QUADRILATERALS

Perimeter is the total distance **around** a closed figure. We add up the length of all the sides to calculate perimeter. Some shapes have formulas to simplify the computations. First we will look at formulas for finding the perimeter of a rectangle. Then we will expand our understanding of perimeter formulas by finding the perimeter of triangles, parallelograms, and squares. Perimeter is measured in regular units.

Area is the **coverage within** a closed figure. We find the number of square units it takes to cover the area of the figure. Some shapes have formulas to simplify the computations. We will find the area of rectangles and triangles, and then we will expand our understanding of area by finding the area of squares and parallelograms. Area is measured in square units.

Perimeter Formulas for a Rectangle

To find the **perimeter** of a rectangle you would add all sides. In this case you would add $8 + 14 + 8 + 14$ which would give **44 inches**. A formula for this method would be **$P = L + W + L + W$** .



There is another way to find the **perimeter** for the rectangle. For this method, double the length of each side, and then add.

$$P = (2 \times 14) + (2 \times 8)$$

$$P = 28 + 16$$

$$P = 44 \text{ inches}$$

$$\text{Formula: } P = (2 \times L) + (2 \times W)$$

There is a third way to find the **perimeter** of the rectangle. Add the length and width first, and then double the sum.

$$P = 2 \times (14 + 8)$$

$$P = 2 \times 22$$

$$P = 44 \text{ inches}$$

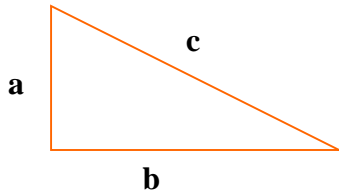
$$\text{Formula: } P = 2 \times (L + W)$$

When calculating perimeter, pick the formula that works best for you!

Perimeter Formulas for Triangle, Parallelogram, and Square

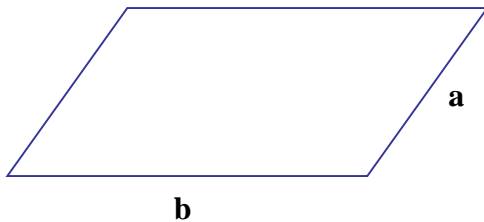
To find the **perimeter** of a polygon, add all sides.

Complete the formula for determining the **perimeter of a triangle** where the length of its sides are represented with **a**, **b**, and **c**.



$$P = a + b + c$$

Study the formula for determining the **perimeter of a parallelogram** where the length of the longer side is represented by **b** and the length of the shorter side is represented by **a**.



$$P = b + a + b + a$$

This formula can be rewritten as

$$P = b + b + a + a$$

which can be rewritten as

$$P = 2 \times b + 2 \times a$$

Study the formula for determining the **perimeter of a square** where the length of one side is represented by **s**.



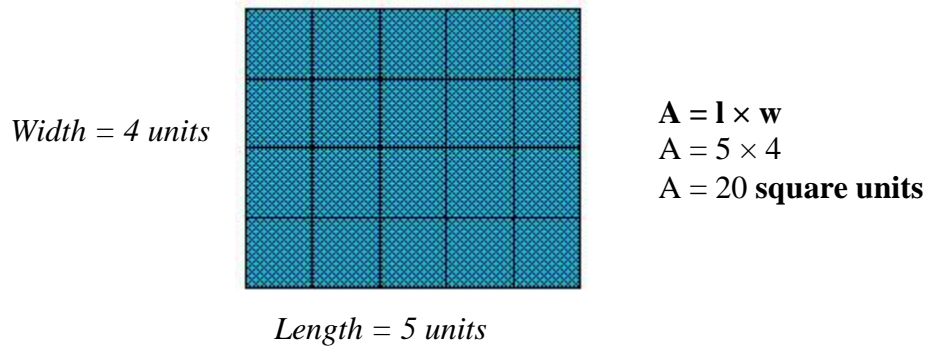
$$P = s + s + s + s$$

This formula can be rewritten as

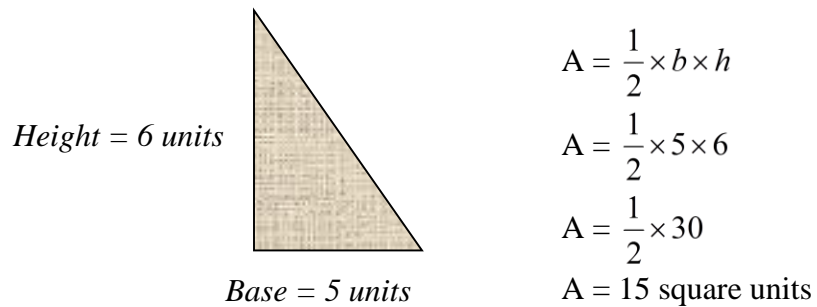
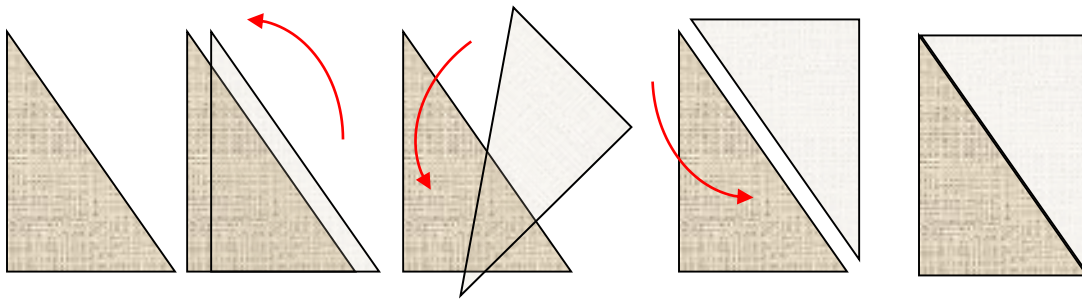
$$P = 4 \times s$$

Area of a Rectangle and a Triangle

The **area of a rectangle** is the product of its length and width. Area is a measurement of coverage and is measured in **square units**.



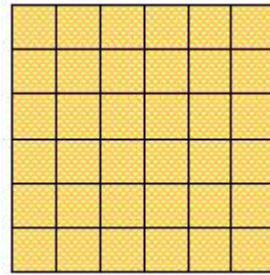
A **triangle's area** is equal to half the area of a rectangle with the same base and height.



Area of a Square and a Parallelogram

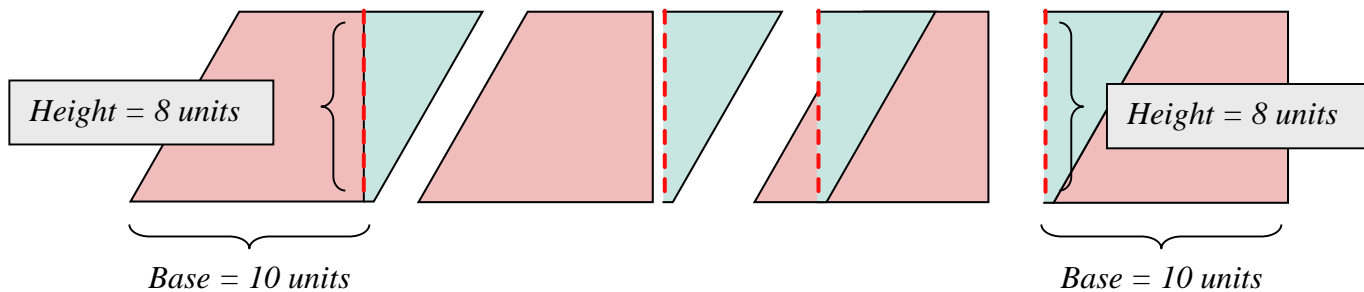
The **area of a square** is the product of its length and width. Since squares have sides of equal length, area of a square is the product of its length (side) and its width (side). Area is a measurement of coverage and is measured in **square units**.

Side = 6 units



$$\begin{aligned} A &= l \times w & A &= s^2 \\ A &= s \times s & A &= 6 \times 6 \text{ or } 6^2 \\ A &= s^2 & A &= 36 \text{ square units} \end{aligned}$$

The **area of a parallelogram** can be rearranged into the shape of a rectangle if the parallelogram is cut along a perpendicular height from the top to its base. Thus, a formula for area can be formed from the rectangle's area formula.



The **area of a parallelogram** is the product of its base and height. The height of a parallelogram is the length of a perpendicular line from the top of the parallelogram to the base. Area is a measurement of coverage and is measured in **square units**.

$$\begin{aligned} A &= l \times w \\ A &= b \times h \end{aligned}$$

$$\begin{aligned} A &= b \times h \\ A &= 10 \times 8 \\ A &= 80 \text{ square units} \end{aligned}$$

Note: The height of this parallelogram is shorter than the length of the side. **Be sure to measure the height of a parallelogram, not its side.**

