Rectangular Prisms - Dimensions

Rectangular prisms are (3-D) three-dimensional figures, which means they have three dimensions: a length, a width, and a height.

The **length** of this rectangular prism is 5 units.

The **height** of this rectangular prism is 2 units.

The **width** of this rectangular prism is 2 units.
Volume of Rectangular Prisms

Volume is the amount of space a three-dimensional figure takes up.

For rectangular prisms, volume may be measured in, or described as, cubic units because it names the number of cubes of a certain size that take up the space of the rectangular prism.

The length is 6 units.
The height is 2 units.
The width is 2 units.

\[ \text{Volume} = \text{Length} \times \text{Width} \times \text{Height} \]

\[ \text{Volume} = 6 \text{ units} \times 2 \text{ units} \times 2 \text{ units} \]

\[ \text{Volume} = 24 \text{ cubic units (units}^3) \]
For rectangular prisms, volume may be measured in, or described as, cubic units because it names the number of cubes of a certain size that take up the space of the rectangular prism.

\[ \text{Volume} = \text{Length} \times \text{Width} \times \text{Height} \]

**For compound figures that are made up of more than one rectangular prism, we can determine the volumes of each and then add them together.**

The volume of the top rectangular prism is:

\[ \text{Volume} = 7 \text{ in.} \times 4 \text{ in.} \times 3 \text{ in.} = 84 \text{ cubic units} \]

The volume of the bottom rectangular prism is:

\[ \text{Volume} = 15 \text{ in.} \times 4 \text{ in.} \times 6 \text{ in.} = 360 \text{ cubic units} \]

Therefore, the total volume is:

\[ 84 + 360 = 444 \text{ cubic units (units}^3) \]
Area of Rectangles

Area is the amount of space a plane figure (two-dimensional) figure takes up.

For rectangles, area may be measured in, or described as, square units because it names the number of squares of a certain size that take up the space of the rectangle.

The **length** is 3 units.
The **width** is 2 units.

\[
\text{Area} = \text{Length} \times \text{Width} \\
\text{Area} = 3\text{units} \times 2\text{ units} \\
\text{Area} = 6\text{ square units (units}^2)\]

3 units

2 units
Using the Area of Rectangles to Deduct

Area is the amount of space a plane figure (two-dimensional) figure takes up. Sometimes, we may need to find areas of different rectangles and remove or add them from other rectangles.

The area of the first figure can be composed of the areas of the two rectangles.

Total Area = (Length x Width) + (Length x Width)

Total Area = (2 x 1) + (3 x 2) = 2 + 6 = 8 square units

The area of the second figure can be determined by removing the area of the smaller rectangle from the area of the larger rectangle.

Total Area = (Length x Width) - (Length x Width)

Total Area = (3 x 3) - (1 x 1) = 9 - 1 = 8 square units
Quadrilaterals are four-sided figures.

Trapezoids are quadrilaterals with at least one pair of parallel sides.

Parallelograms are trapezoids with two pairs of parallel sides.

Rectangles are parallelograms with right angles.

Squares are rectangles with four equal sides.

Rhombuses are parallelograms with four equal sides.

Kites are quadrilaterals with two sets of adjacent sides equal in length.
Quadrilaterals are four-sided figures. Quadrilaterals include:

- **Trapezoids** are quadrilaterals with at least one pair of parallel sides.
- **Parallelograms** are trapezoids with two pairs of parallel sides.
- **Rectangles** are parallelograms with right angles.
- **Squares** are rectangles with four equal sides.
- **Rhombuses** are parallelograms with four equal sides.
- **Kites** are quadrilaterals with two sets of adjacent sides equal in length.

The interior angles of quadrilaterals always add up to 360°.

\[
40° + 140° + 90° + 90° = 360° \\
107° + 100° + 73° + 80° = 360°
\]
An **axis** is a fixed reference line for the measurement of coordinates.

A **coordinate plane** is a flat surface spanned by two perpendicular axes (the x-axis and the y-axis). The coordinates of a point are distances from the two perpendicular axes.

An **ordered pair** is a pair of numbers written in a particular order to describe the location of a point. (Distance along the x-axis, distance along the y-axis) or (x, y).

The **origin** is a fixed point from which coordinates are measured. This fixed point has a coordinate of (0, 0).

**ordered pair:** The location of the triangle is (2, 5).
Parallel lines are two lines in a plane that do not, and will not ever, intersect because all points on one line maintain the same distance apart from the other line.

The orange line is running parallel to the y-axis. The pink line is running parallel to the x-axis.

Perpendicular lines are two lines in a plane that intersect one another and form right angles (90°).

The orange line is running perpendicular to the x-axis. The pink line is running perpendicular to the y-axis.