
AREA OF 2D SHAPES

Demonstrate an understanding of area of regular and irregular 2-D shapes by:

- recognizing that area is measured in square units
 - selecting and justifying referents for the units cm^2 or m^2
 - estimating area by using referents for cm^2 or m^2
 - determining and recording area (cm^2 or m^2)
 - constructing different rectangles for a given area (cm^2 or m^2) in order to demonstrate that many different rectangles may have the same area.
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Describe area as the measure of surface recorded in square units.

Area is defined as the total space taken up by a flat (2-D) surface or shape of an object.

The space enclosed by the boundary of a plane figure is called its area.

The area of a figure is the number of unit squares that cover the surface of a closed figure.

Area is measured in square units like **cm²** and **m²**.

Identify and explain why the square is a most efficient unit for measuring area

This is because an area is measured by **computing the product of two lengths**. For example if those are defined in meters, you multiply some meters by some other meters. Therefore the way to say that the area is in square meters.

What is an example of a referent unit?

For example, **your waist height could be used as a referent for one metre.** If you determine the height of the seat of a chair to be approximately half of your waist height, then the seat of the chair is 0.5 metres high.

Estimate the area of a 2-D shape using personal referents

Area is the term used to define the amount of space taken up by a 2D shape or surface. We measure area in square units : cm^2 or m^2 . Area is calculated by **multiplying the length of a shape by its width**.

Determine the area of a regular 2-D shape and explain the strategy used.

SQUARE: A square is a 2D shape with four equal sides and all four angles equal to 90° .

The area of a square is the product of its two adjacent sides.

Since all sides of the square are equal.

Area of Square

$$= \text{Side} \times \text{Side}$$

Area of Square

$$= (\text{Side})^2$$

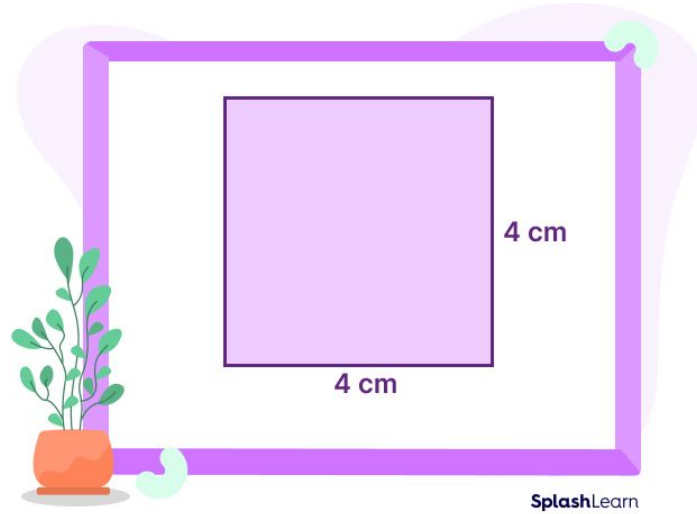
Area of a Square

$$= s^2$$

We can see that while measuring the area of a square, we consider only the length of its side.

Let's take an example of the given square and try to find its area.

SOLVE IT FOR ME:



AREA OF RECTANGLE

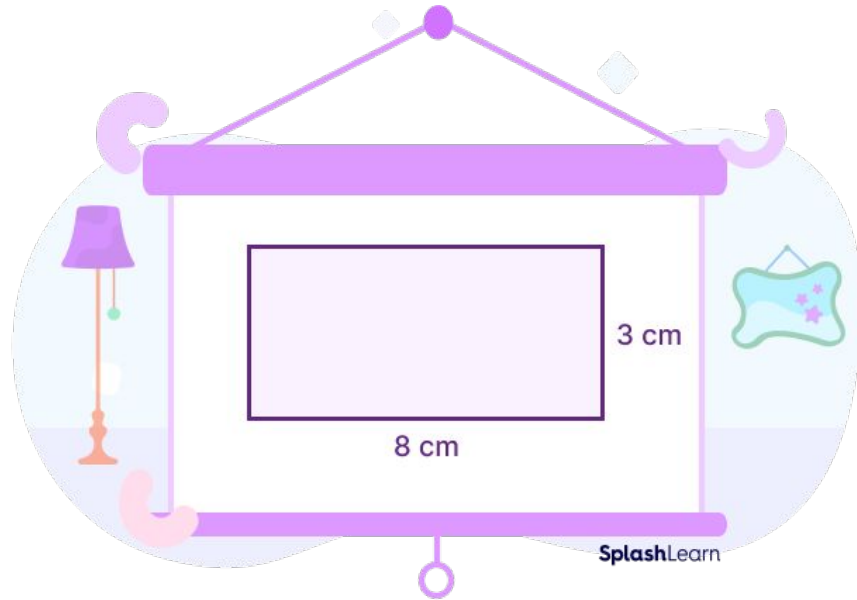
Rectangle is a 2D shape with four sides. Opposite sides of a rectangle are equal and all four angles are equal to 90°

The area of a rectangle is the product of its two adjacent sides.

Area of Rectangle: Length X Width

We can see that while measuring the area of a rectangle, we consider both the length and width of the rectangle.

We have a rectangle here of length 8 cm and width 3 cm. Let's try to find its area.



Area of a Triangle

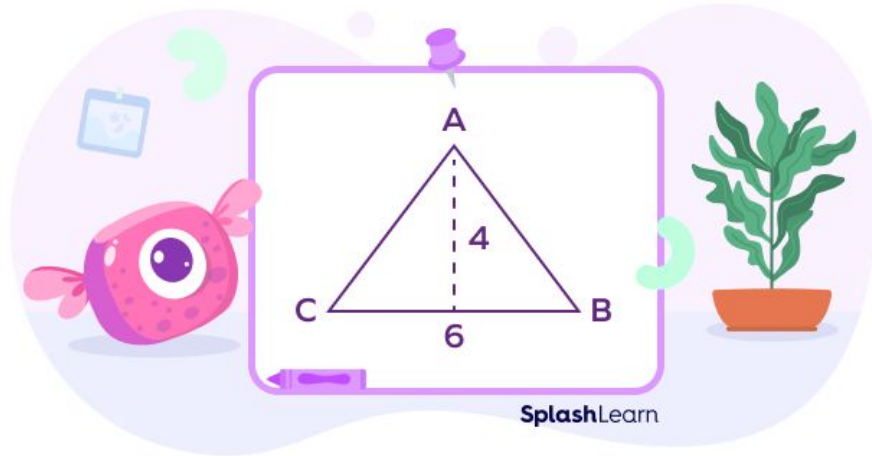
A triangle is a 2D shape with three sides (edges) and three vertices. A triangle with vertices A, B, and C is denoted as $\triangle ABC$.

For a given triangle, where the height of the triangle is h and the base is b , the area of the triangle can be calculated by the formula:

$$\text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$\text{Area of triangle} = \frac{1}{2} \times b \times h$$

Let's take an example of the given triangle ABC.



Construct a rectangle with a given area.

A square with a side length of 1 is called a **unit square**. Its area is 1 square unit.

Rectangles have 4 sides and opposite sides are equal.

Shade 24 unit squares to make a rectangle. Make sure that the shape you shaded has 4 sides and that opposite sides of the shape are equal.

Here is an example of a rectangle with an area of 24 square units. The top and bottom sides are **4 units** long. The left and right sides are **6 units** long.

To find the area of 2D figures using this method, we count the number of squares that cover the surface of the figure.

While counting the squares, we follow these **rules**:

- If the figure is covered by less than half a square, count it as zero.
 - If the figure is covered by more than half a square, count it as 1 unit.
 - If the figure is covered by exactly half a square, count it as $\frac{1}{2}$ a unit.
 - If the figure is covered by a full square, count it as 1 unit.
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Fun Facts!

- Among all the shapes with the same perimeter, a circle has the largest area.
 - A rectangle with all sides equal is called a square.
 - All squares are rectangles but all rectangles are not squares.
 - Note that the term surface area is used to represent the total area of all the outer faces of a 3D solid figure. Area is the region bounded within the boundaries of a 2D shape. Thus, the surface area of 2D shapes is nothing but the area of a 2D shape.
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Conclusion

The next time you want to roll out a grass lawn to cover your front yard, you can find the area of the yard to figure out the size of roll-out lawn needed to make your front yard beautiful.

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