

AREA UNITS

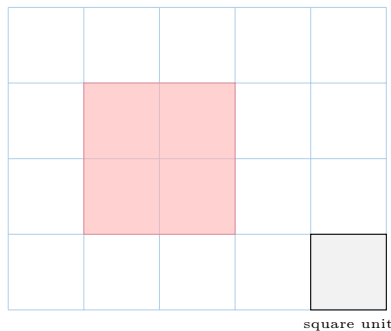
A AREA

Definition Area

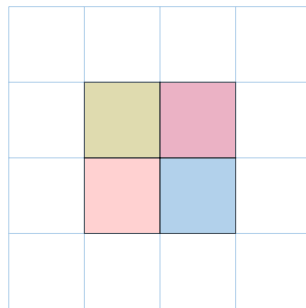
The **area** of a shape is how much space it covers on a flat surface.
We measure area by counting how many **square units** fit inside the shape.

To find the area of a shape, we can place it on a grid and count the total number of squares it covers.
You can think of it like tiling a floor — the area is the total number of tiles you use.

Ex: Find the area of the green shape. Each small square in the grid is **1 square unit**.



Answer: To find the area, we count each square unit inside the shape.



There are **4** small squares inside the shape.
So, the area is **4 square units**.

B UNITS OF AREA

Discover: When we measure area, it is important to use **standard units** so that everyone gets the same measurement. Non-standard units, such as books or tiles of different sizes, can give different answers because they are not all the same size. For area, we use standard units like the **square centimeter** and the **square meter**.

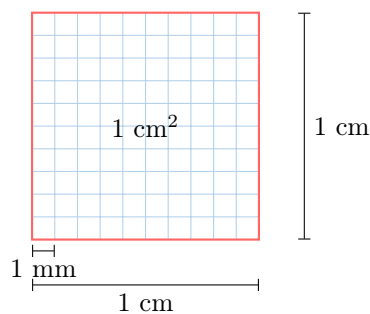
Definition Units of Area

Area is measured in **square units**. The standard units are based on the metric system.

- **Square Kilometer (km^2):** The area of a square with sides 1 km long. Used for very large areas like cities or national parks.
- **Square Meter (m^2):** The area of a square with sides 1 m long. Used for areas like rooms, gardens, or classrooms.
- **Square Centimeter (cm^2):** The area of a square with sides 1 cm long. Used for small surfaces like book covers or photos.
- **Square Millimeter (mm^2):** The area of a square with sides 1 mm long. Used for very tiny areas.

C CONVERSION OF AREA UNITS

Discover: Let's see how area units are related. Consider a square with an area of **1 cm^2** . Since $1 \text{ cm} = 10 \text{ mm}$, each side of this square is 10 mm long.



Each small square is 1 mm^2 . To find the area in mm^2 , we multiply its length in mm by its width in mm:

$$\begin{aligned} 1 \text{ cm}^2 &= 1 \text{ cm} \times 1 \text{ cm} \\ &= 10 \text{ mm} \times 10 \text{ mm} \\ &= 100 \text{ mm}^2 \end{aligned}$$

So, **1 cm^2 is equal to 100 mm^2** . The conversion factor is squared!

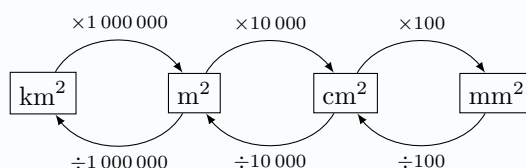
Proposition Conversion of Area Units

Because we multiply two lengths to get an area, the conversion factors are squared.

- $1 \text{ cm}^2 = (10 \times 10) \text{ mm}^2 = \mathbf{100 \text{ mm}^2}$
- $1 \text{ m}^2 = (100 \times 100) \text{ cm}^2 = \mathbf{10,000 \text{ cm}^2}$
- $1 \text{ km}^2 = (1000 \times 1000) \text{ m}^2 = \mathbf{1,000,000 \text{ m}^2}$

Method Converting Using Multiplication or Division

- Use **multiplication** to go from a larger unit to a smaller one (like square meters to square centimeters).
- Use **division** to go from a smaller unit to a larger one (like square centimeters to square meters).



Method Converting Using a Place Value Table

For area, each unit in the place value table is split into **two columns**. Let's convert 10.5 m^2 to cm^2 .

1. **Draw the area conversion table.** Each unit has two columns.

km ²	ha		m ²		cm ²	mm ²

2. **Place the number in the table.** The rule is: the digit in the **ones place** goes into the **right-hand column** of the starting unit. For 10.5 m^2 , the ones digit is **0**, so it goes in the right-hand column of **m²**. Then place the other digits in the neighbouring columns, keeping their order (tens to the left, decimal digits to the right).

km ²	ha		m ²		cm ²	mm ²
			1	0	5	

3. **Move the decimal point** to the right side of your target unit's columns. Our target is **cm²**. Fill any empty columns with zeros.

km ²	ha		m ²		cm ²	mm ²
			1	0	5	0

4. **Read the final number.** The decimal point is now at the far right.

$$\text{So, } 10.5 \text{ m}^2 = 105\,000 \text{ cm}^2.$$