

Nat 5 Applications of Mathematics

Area – Key Concepts & Formulas

What is Area?

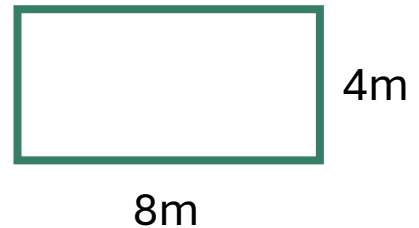
Area is the amount of space a two-dimensional shape occupies. Think of it like painting a wall— the area is how much paint you need to cover the entire surface. We always measure area in square units. If the measurements are in meters, the area is in square meters (m^2). If the measurements are in centimetres, the area is in square centimetres (cm^2).

Essential Formulas You Need to Know

Rectangle:

Formula: $\text{Area} = \text{length} \times \text{width}$

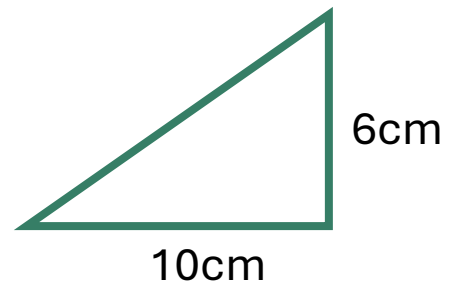
Example: A rectangle with a length of 8 meters and a width of 4 meters has an area of $8 \times 4 = 32$ square meters (m^2).



Triangle:

Formula: $\text{Area} = (1/2) \times \text{base} \times \text{height}$

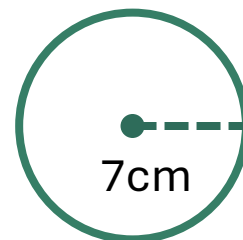
Example: A triangle with a base of 10 centimetres and a height of 6 centimetres has an area of $(1/2) \times 10 \times 6 = 30$ square centimetres (cm^2).



Circle:

Formula: $\text{Area} = \pi \times \text{radius}^2$ ($\pi \approx 3.14$)

Example: A circle with a radius of 7 centimetres has an area of $3.14 \times 7^2 = 153.86$ square centimetres (cm^2).



Nat 5 Applications of Mathematics

Area – Tackling Complex Shapes

Breaking it Down

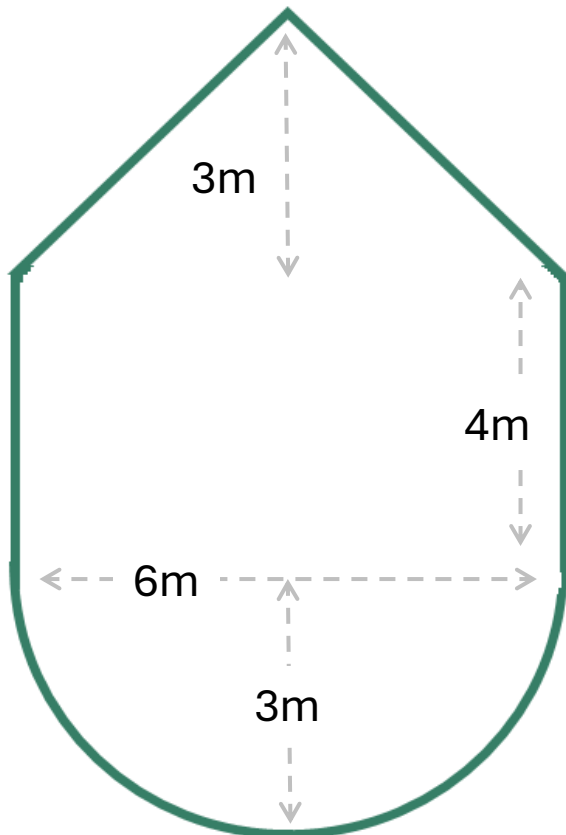
Composite shapes are made up of two or more basic shapes put together. To calculate their area, we break them down into the shapes we know, calculate the area of each part, and then add or subtract as needed.

Steps to Success

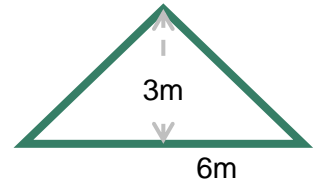
1. Divide and Conquer: Look at the composite shape and see if you can divide it into rectangles, triangles, circles, or semi-circles.
2. Label Clearly: Label each shape you identify (e.g., A, B, C).
3. Formula Time: Apply the correct formula to calculate the area of each individual shape.
4. Add or Subtract: If shapes are combined, add their areas. If a shape is cut out from another, subtract the smaller area from the larger one.

Visual Aid is Key!

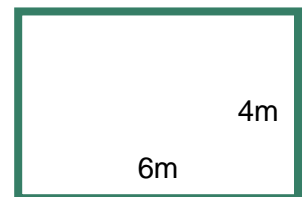
Draw a diagram and label the different parts to visualize the problem clearly.



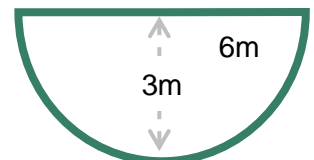
Triangle:
 $(L \times H) / 2$
 $(6 \times 3) / 2$
 $18 / 2$
 $= 9m^2$



Rectangle:
 $L \times H$
 6×4
 $= 24m^2$



Semicircle:
 $(\pi r^2) / 2$
 $(3.14 \times 9) / 2$
 $28.26 / 2$
 $= 14.13m^2$



Total area of complex shape:
Triangle + Rectangle + Semicircle
 $9 + 24 + 14.13$
 $= 47.13m^2$



Nat 5 Applications of Mathematics

Area Practice – Show Your Skills!

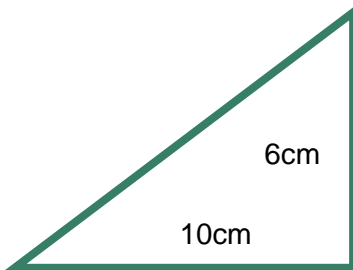
- 1** Calculate the area of a rectangle with length 8m and width 4m



Working

Answer

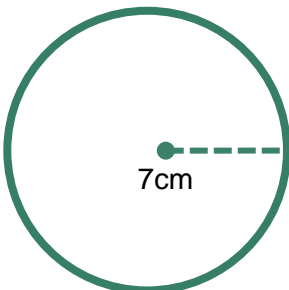
- 2** Find the area of a triangle with base 10cm and height 6cm



Working

Answer

- 3** Calculate the area of a circle with radius 7cm (use $\pi = 3.14$)



Working

Answer

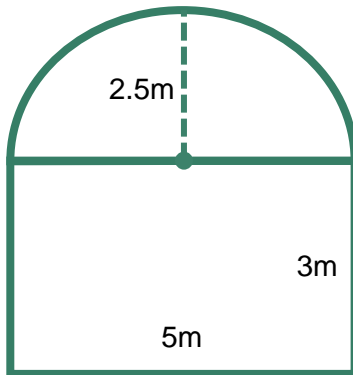


Nat 5 Applications of Mathematics

Area Practice – Challenge Yourself!

4

Find the area of a shape made up of a rectangle ($5\text{m} \times 3\text{m}$) with a semicircle (radius 2.5m) on top



Working

Step 1: Identify the shapes – A rectangle and a semi-circle.

Step 2: Calculate the area of the rectangle.

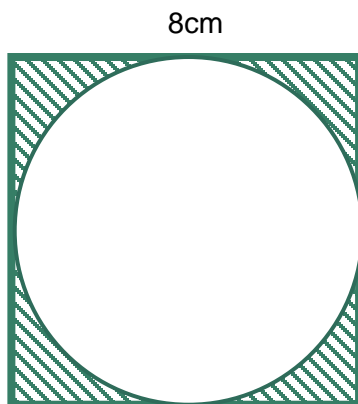
Step 3: Calculate the area of the full circle and then divide by 2 to get the area of the semi-circle.

Step 4: Add the area of the rectangle and the semi-circle.

Answer

5

Calculate the shaded area between a square of side 8cm and an inscribed circle



Working

Step 1: Identify the shapes – A square and a circle.

Step 2: Calculate the area of the square.

Step 3: The diameter of the circle is equal to the side of the square. Calculate the radius of the circle.

Step 4: Calculate the area of the circle.

Step 5: Subtract the area of the circle from the area of the square.

Answer

