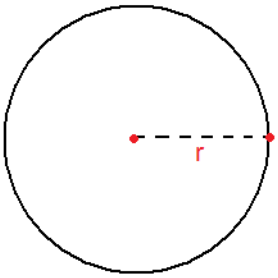
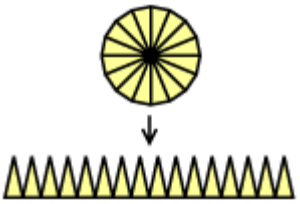
Area of a Circle

The area *A* of any circle is equal to the product of p and the square of the radius *r*.

Area: $A = p\,(radius)^2 = pr^2$

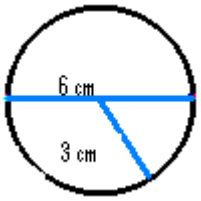


The circumference of a circle is 2πr. This is the definition of π (pi). Divide the circle into many triangular segments. The area of the triangles is 1/2 times the sum of their bases, 2πr (the circumference of the circle), times their height, r.



So, how can this lead to the formula of the area of a circle?

A circle has a radius (r) and a diameter (d). Here is how they are related.



d = 6 cm r = 3 cm 2×r=d

You can use the formula A = πr2 to find the area of the circle.
π ≈ 3.14

The symbol ≈ means “approximately equals to.”
$A = 3.14 \times 3^2$
Multiply 3.14 × 3 × 3 = 28.26

The area is $28.26\ \text{cm}^2$.

Examples:

A- Find the area of a circle with the given radius.

1) radius = 7 m

$Area = \pi \, x \, r^2$

Area = 3.14 x 7^2

Area = 3.14 x 49

Area = 153.86 m^2

2) radius = 54 cm

$Area = \pi \, x \, r^2$

Area = 3.14 x 54^2

Area = 3.14 x 2,916

Area = 9,156.24 cm^2

B- Find the area of a circle with a diameter of 16 cm. let π = $\frac{22}{7}$.

Step 1: Find the ray. Ray = Diameter ÷ 2 = 16 ÷ 2 = 8 cm

Step 2: Calculate the area when $Area = \pi \, x \, r^2$

Step 3: Replace π by $\frac{22}{7}$ Area = $\frac{22}{7}$ x 8^2 = $\frac{22}{7}$ x 64 = 1,408

Area = 201.14 cm^2