

Properties of Geometric Shapes

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1. Triangles:

- Three-sided polygon.
- Types: equilateral (all sides equal), isosceles (two sides equal), scalene (no sides equal).
- Angles: sum of angles always 180 degrees.
- Area: $0.5 * \text{base} * \text{height}$.

2. Rectangles:

- Four-sided polygon with opposite sides equal.
- All angles are right angles (90 degrees).
- Area: $\text{length} * \text{width}$.
- Perimeter: $2 * (\text{length} + \text{width})$.

3. Circles:

- Round shape with all points equidistant from the center.
- Diameter: twice the radius.
- Circumference: $2 * \pi * \text{radius}$.
- Area: $\pi * \text{radius}^2$.

4. Squares:

- Special type of rectangle with all sides equal.
- All angles are right angles (90 degrees).
- Area: side^2 .
- Perimeter: $4 * \text{side}$.

5. Polygons:

- Closed shape with straight sides.
- Regular polygons have equal sides and angles.
- Sum of interior angles: $(n-2) * 180$ degrees for n sides.
- Exterior angles sum up to 360 degrees.

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6. Quadrilaterals:

- Four-sided polygon.
- Types: square, rectangle, rhombus, parallelogram, trapezoid.
- Sum of angles always 360 degrees.
- Diagonals may bisect each other.

7. Cylinders:

- Three-dimensional shape with two circular bases.
- Volume: $\pi * \text{radius}^2 * \text{height}$.
- Surface area: $2 * \pi * \text{radius} * \text{height} + 2 * \pi * \text{radius}^2$.

8. Prisms:

- Three-dimensional shape with two parallel bases.
- Volume: $\text{base area} * \text{height}$.
- Surface area: $2 * \text{base area} + \text{base perimeter} * \text{height}$.

Understanding the properties of geometric shapes is essential in mathematics, engineering, architecture, and various other fields where spatial reasoning is required.