

Geometry Ultimate Cheat Sheet

Comprehensive Formulas, Theorems, and Properties

1. Lines and Angles

- **Supplementary Angles:** $\angle A + \angle B = 180^\circ$
- **Complementary Angles:** $\angle A + \angle B = 90^\circ$
- **Vertically Opposite Angles:** Equal in measure.
- **Alternate Interior Angles:** Equal when lines are parallel.

2. Triangles

- **Sum of Angles:** $\alpha + \beta + \gamma = 180^\circ$
- **Area (Base-Height):** $A = \frac{1}{2}bh$

- **Area (Heron's Formula):**

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

where $s = \frac{a+b+c}{2}$.

- **Pythagorean Theorem:** In a right-angled triangle:

$$a^2 + b^2 = c^2$$

3. Quadrilaterals

- **Rectangle:** $A = l \times w$, $P = 2(l + w)$
- **Square:** $A = s^2$, $P = 4s$
- **Parallelogram:** $A = b \times h$
- **Trapezoid:** $A = \frac{a+b}{2} \cdot h$

4. Circles

- **Circumference:** $C = 2\pi r$
- **Area of Circle:** $A = \pi r^2$
- **Arc Length:** $s = r\theta$ (θ in radians)
- **Sector Area:** $A = \frac{1}{2}r^2\theta$

5. 3D Solids

- **Sphere Volume:** $V = \frac{4}{3}\pi r^3$
- **Sphere Surface Area:** $A = 4\pi r^2$
- **Cylinder Volume:** $V = \pi r^2 h$
- **Cone Volume:** $V = \frac{1}{3}\pi r^2 h$