

Geometry Cheat Sheet

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1. Basic Properties & Angles

- **Triangle Sum Theorem:** The sum of angles in a triangle is 180° (or π radians).
- **Exterior Angle Theorem:** An exterior angle of a triangle equals the sum of the two opposite interior angles.
- **Parallel Lines:** When a transversal crosses parallel lines, corresponding, alternate interior, and alternate exterior angles are equal.

2. Triangles

- **Area (General):** $A = \frac{1}{2}bh$
- **Area (Heron's Formula):** $A = \sqrt{s(s-a)(s-b)(s-c)}$ where $s = \frac{a+b+c}{2}$
- **Right Triangle (Pythagorean Theorem):** $a^2 + b^2 = c^2$
- **Equilateral Triangle Area:** $A = \frac{\sqrt{3}}{4}s^2$

3. Quadrilaterals

- **Rectangle:** Area $A = lw$, Perimeter $P = 2(l + w)$
- **Square:** Area $A = s^2$, Perimeter $P = 4s$
- **Parallelogram:** Area $A = bh$
- **Trapezoid:** Area $A = \frac{a+b}{2}h$
- **Rhombus:** Area $A = \frac{1}{2}d_1d_2$

4. Circles

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

5. 3D Solids

- **Rectangular Prism:** Volume $V = lwh$, Surface Area $SA = 2(lw + lh + wh)$
- **Cylinder:** Volume $V = \pi r^2h$, Surface Area $SA = 2\pi rh + 2\pi r^2$
- **Sphere:** Volume $V = \frac{4}{3}\pi r^3$, Surface Area $SA = 4\pi r^2$
- **Cone:** Volume $V = \frac{1}{3}\pi r^2h$, Surface Area $SA = \pi rl + \pi r^2$

6. Coordinate Geometry

- **Distance Formula:** $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
- **Midpoint Formula:** $M = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$
- **Slope:** $m = \frac{y_2 - y_1}{x_2 - x_1}$
- **Equation of a Line:** $y - y_1 = m(x - x_1)$