CHEAT SHEETS HERO Geometry Cheatsheet

A quick reference guide to basic geometric concepts, formulas, and theorems, covering areas, volumes, and angle relationships.

Basic Shapes & Formulas

2D Shapes: Area & Perimeter

Square Area: (s) is side length	$A = s^2$
Perimeter: (s) is side length	$P = 4s$
Rectangle Area: (l) is length, (w) is width	$A = lw$
Perimeter: (l) is length, (w) is width	$P = 2l + 2w$
Triangle Area: (b) is base, (h) is height	$A = \frac{1}{2}bh$
Circle Area: (r) is radius	$A = \pi r^2$
Circumference: (r) is radius	$C = 2\pi r$
Parallelogram Area: (b) is base, (h) is height	$A = bh$

3D Shapes: Volume & Surface Area

Cube Volume: (s) is side length	$V = s^3$
Surface Area: (s) is side length	$SA = 6s^2$
Rectangular Prism Volume: (l) is length, (w) is width, (h) is height	$V = lwh$
Surface Area: (l) is length, (w) is width, (h) is height	$SA = 2(lw + lh + wh)$
Sphere Volume: (r) is radius	$V = \frac{4}{3}\pi r^3$
Surface Area: (r) is radius	$SA = 4\pi r^2$
Cylinder Volume: (r) is radius, (h) is height	$V = \pi r^2 h$
Surface Area: (r) is radius, (h) is height	$SA = 2\pi rh + 2\pi r^2$

Angles and Lines

Angle Relationships

Complementary Angles: Two angles whose measures add up to 90 degrees.

Supplementary Angles: Two angles whose measures add up to 180 degrees.

Vertical Angles: Angles opposite each other when two lines intersect; they are congruent.

Adjacent Angles: Angles that share a common vertex and side but do not overlap.

Corresponding Angles: Angles in the same relative position when a transversal intersects two parallel lines; they are congruent.

Alternate Interior Angles: Angles on opposite sides of the transversal and inside the parallel lines; they are congruent.

Alternate Exterior Angles: Angles on opposite sides of the transversal and outside the parallel lines; they are congruent.

Lines

Parallel Lines: Lines that never intersect and have the same slope.

Perpendicular Lines: Lines that intersect at a 90-degree angle and have slopes that are negative reciprocals of each other.

Transversal: A line that intersects two or more other lines.

Slope: The measure of the steepness of a line, calculated as rise over run (change in y divided by change in x).

Triangles

Types of Triangles

Equilateral Triangle: A triangle with all three sides equal in length and all three angles equal to 60 degrees.

Isosceles Triangle: A triangle with two sides equal in length and two angles equal in measure.

Scalene Triangle: A triangle with all three sides of different lengths and all three angles of different measures.

Right Triangle: A triangle with one angle equal to 90 degrees.

Acute Triangle: A triangle with all three angles less than 90 degrees.

Obtuse Triangle: A triangle with one angle greater than 90 degrees.

Triangle Properties

Sum of Angles: The sum of the interior angles in any triangle is always equal to 180 degrees.	$A + B + C = 180°$
Pythagorean Theorem: In a right triangle, the square of the length of the hypotenuse (the side opposite the right angle) is equal to the sum of the squares of the lengths of the other two sides.	$a^2 + b^2 = c^2$
Triangle Inequality Theorem: The sum of the lengths of any two sides of a triangle must be greater than the length of the third side.	$a + b > c, a + c > b, b + c > a$
Area of a Triangle using Trigonometry: Area using sine of an angle.	$A = \frac{1}{2}ab\sin(C)$

Circles

Circle Terminology

Radius: The distance from the center of the circle to any point on the circle.
Diameter: The distance across the circle through the center; it is twice the radius.
Circumference: The distance around the circle.
Chord: A line segment connecting two points on the circle.
Tangent: A line that touches the circle at exactly one point.
Secant: A line that intersects the circle at two points.
Arc: A portion of the circumference of a circle.
Sector: A region bounded by two radii and an arc of the circle.

Circle Formulas

Circumference:	$C = 2\pi r$
Area:	$A = \pi r^2$
Arc Length: `\theta` is the central angle in radians.	$s = r\theta$
Area of a Sector: `\theta` is the central angle in radians.	$A = \frac{1}{2}r^2\theta$