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Geometry Note Card

Angles

Supplementary Angles add to make 180˚

Linear Pair add to 180˚ and share a side

Complementary Angles add to make 90˚

Adjacent Angles are next to one another

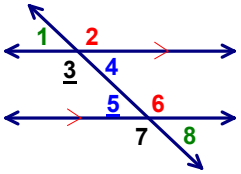
Vertical Angles are across and equal

Acute Angles are less than 90˚

Right Angles are equal to 90˚

Obtuse Angles are greater than 90˚ and less than 180˚

Parallel Lines crossed by a **Transversal**



Alternate Interior Angles are equal Ex: $\angle 4 = \angle 5$

Alternate Exterior Angles are equal Ex: $\angle 1 = \angle 8$

Same Sided Interior Angles Add to 180˚ Ex: $\angle 3 + \angle 5 = 180°$

Corresponding Angles are equal Ex: $\angle 2 = \angle 6$

Lines and Planes

Term	Notation or Definition	Example
Line	$\overleftrightarrow{AB}$	A B
Ray	$\overrightarrow{AB}$	A B
Segment	$\overline{AB}$	A B
Collinear	**Points on the same line**	A B C
Perpendicular	$AB \perp CD$	C, A, B, D
Parallel	$WX \parallel YZ$	W, X, Y, Z
Skew	AB and CD never hit And are not parallel	A, B, C, D
Perpendicular Bisector	$\overrightarrow{BD}$ divides segment AC in half and is perpendicular	A, B, C, D
Plane	Plane z is a flat surface extending in all directions	A, B, C, Plane z
Coplaner	Points A, B and C are coplanar (on the same plane)	

Triangles

Classifying By Side Length:

Scalene: no sides the same

Isosceles: 2 sides the same

Equilateral: All sides the same

Classifying By Largest Angle

Acute: less than 90˚

Right: equal to 90˚

Obtuse: greater than 90˚

The Altitude can be inside, on or outside a triangle.

inside the Δ on the Δ outside the Δ

Proving Two Triangles Congruent

SSS: 3 pairs of congruent sides

SAS: 2 pairs of congruent sides and one equal angle between

AAS: 2 pairs of congruent angles and one pair of congruent sides

ASA: 2 pairs of congruent angles and 1 pair of congruent sides between

Interior Angles Sum to 180˚ in every triangle

An Exterior Angle equals the sum of the two remote interior angles.

$50° + 70° = 120°$

Pythagorean Theorem

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

Ex: Find c

$3^2+4^2=c^2$

$25 = c^2$

$5 = c$

Special Right Triangles

45° 45° 90° Side Ratios

30° 60° 90° Side Ratios

Proving Two Triangles Similar

Sides must be in the same ratio and angles must be equal.

SSS: 3 pairs of similar sides

AA: 2 pairs of congruent angles

SAS: 2 pairs of similar sides & 1 pair of equal angles between

Polygons

Polygon: two-dimensional closed figure made of straight line segments connected end to end (& don't cross)

Polygon Not Polygons

Polygon Parts:

exterior angle, interior angle, Diagonal, Vertices, A, B

Convex Polygons: all diagonals are inside the shape

Convex

Concave Polygon: at least one diagonal Is outside the shape

Diagonal Outside

Concave

Regular Polygons have equal sides & angles

Sum of Exterior Angles in all polygons

$\angle 1 + \angle 2 + \angle 3 = 360°$

Sum of Interior Angles = (# of sides –2)•180˚

Ex: Sum the 5 angles below: $(5\ sides - 2) \cdot 180° = (3) \cdot 180° = 540°$

$\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 = 540$

Quadrilateral	4 Sides
Pentagon	5 Sides
Hexagon	6 Sides
Heptagon	7 Sides
Octagon	8 Sides
Nonagon	9 Sides
Decagon	10 Sides
N-gon	N Sides

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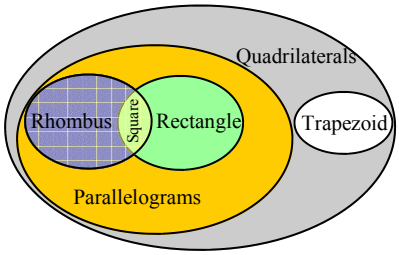
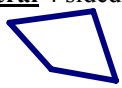
Quadrilaterals

Relationship Between Quadrilaterals

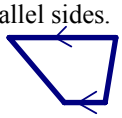
Ex: A Rectangle is a Parallelogram and a Quadrilateral but not a Trapezoid.



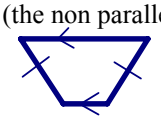
Quadrilateral 4 sided polygon



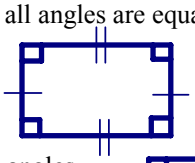
Trapezoids Quadrilateral with just 1 pair of parallel sides.



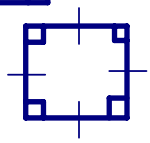
Isosceles Trapezoid also has 2 equal sides. (the non parallel sides)



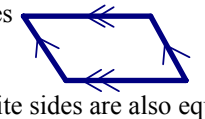
Rectangle all angles are equal: 90°



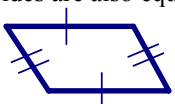
Square all angles and all sides equal



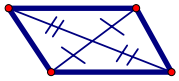
Parallelogram: 2 pairs of parallel sides



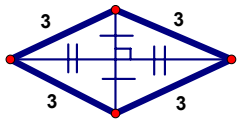
Opposite sides are also equal in length



Diagonals bisect one another



Rhombus all sides are equal & diagonals are perpendicular bisectors



Circles

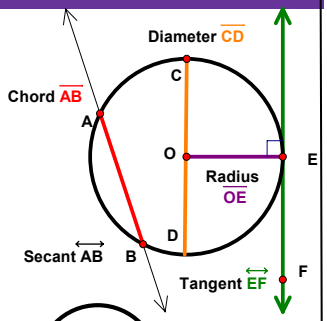
Diameter: $\overline{CD}$ goes across the circle through the center

Radius: $\overline{OE}$ goes from the center to the outside of the circle

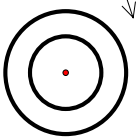
Chord: $\overline{AB}$ connects 2 points on the circle

Secant: $\overleftrightarrow{AB}$ intersects the circle in 2 points

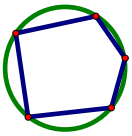
Tangent: $\overleftrightarrow{EF}$ touches at 1 point and is perpendicular to the radius.



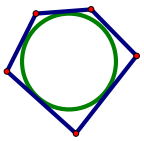
Concentric Circles have the same center



Polygon Inscribed in a circle



Polygon Circumscribed about a circle



ARCS

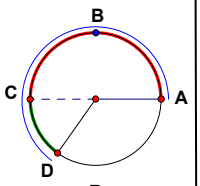
Semicircle: $\overset{\frown}{ABC}$ is half the circumference

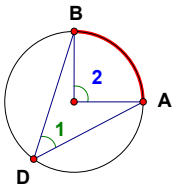
Major Arc: $\overset{\frown}{ACD}$ is greater than 180°

Minor Arc: $\overset{\frown}{CD}$ is less than 180°

Central Angle: $\angle 2$ has a vertex at the center and is the same as arc $\overset{\frown}{AB}$

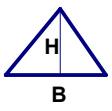
Inscribed Angle: $\angle 1$ is half intercepted arc $\overset{\frown}{AB}$



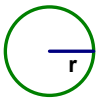


Area

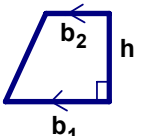
Triangle: $A=\frac{1}{2}B\cdot H$



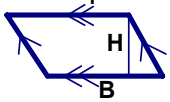
Circle: $A=\pi r^2$



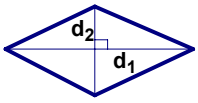
Trapezoid: $A=\frac{1}{2}(b_1+b_2)h$



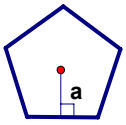
Parallelogram: A=B•H



Rhombus: $A=\frac{1}{2}(d_1\bullet d_2)$



Regular Polygon: $A=\frac{1}{2}a\bullet P$

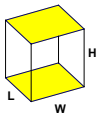


a=apothem P=perimeter

Volume

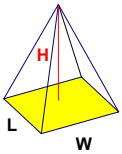
Prism:
V=(area of base)•(vertical height)

For Rectangular base: L•W•H



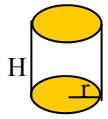
Pyramid:
V=⅓(area of base)•(vertical height)

For rectangular base: ⅓ L•W•H



Cylinder: $V=\pi r^2H$

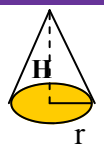
V=(area of base)•(vertical height)



Sphere:

$V=\frac{4}{3}\pi r^3$ $\quad Area=4\pi r^2$

Cone: $V=\frac{1}{3}\pi r^2H$



Midpoint & Distance

Midpoint Formula: $\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$

Ex: Find the midpoint of (2,1) and (10,7)

$$\left(\frac{2+10}{2},\frac{1+7}{2}\right)=\left(\frac{12}{2},\frac{8}{2}\right)=(6,4)$$

Distance Formula:

$$\sqrt{(x_2-x_1)^2+(y_1-y_2)^2}$$

Ex: Find the distance from (1,2) to (4,6)

$$=\sqrt{(4-1)^2+(6-2)^2}$$
$$=\sqrt{(3)^2+(4)^2}$$
$$=\sqrt{9+16}=\sqrt{25}=5$$

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