Geometry A Final Exam Reference Sheet

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

Slope $m = \frac{y_2 - y_1}{x_2 - x_1}$

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

Rotation Rules

90° counterclockwise about the origin $(x, y) \to (-y, x)$

180° counterclockwise about the origin $(x, y) \to (-x, -y)$

270° counterclockwise about the origin $(x, y) \to (y, -x)$

Reflect

$x - axis$	$(x, y) \to (x, -y)$	$y - axis$	$(x, y) \to (-x, y)$
$y = x$	$(x, y) \to (y, x)$	$y = -x$	$(x, y) \to (-y, -x)$

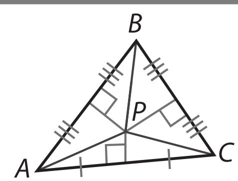
Polygon Sum Theorem $(n - 2) \cdot 180°$

Exterior Angle Theorem Exterior Angle = Sum of 2 Remote Interior Angles

Circumcenter Theorem

The perpendicular bisectors of the sides of a triangle intersect at a point that is equidistant from the vertices of the triangle.

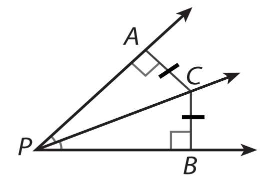
$PA = PB = PC$



Angle Bisector Theorem

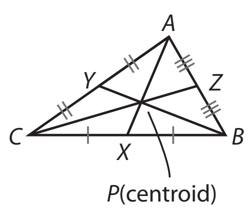
If a point is on the bisector an of angle, then it is equidistant from the sides of the angle.

$\angle APC \cong \angle BPC$, so $AC = BC$.



Centroid Theorem

The centroid theorem states that the **centroid** of a triangle is located $\frac{2}{3}$ of the distance from each vertex to the midpoint of the opposite side.



$AP = \frac{2}{3}AX$ $\qquad BP = \frac{2}{3}BY$ $\qquad CP = \frac{2}{3}CZ$

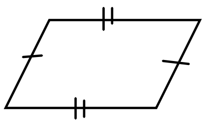
Quadrilateral Properties

POLYGON ANGLE SUM THM: Sum of interior angles in a convex polygon: $(n-2)\cdot 180°$

POLYGON EXTERIOR ANGLE SUM THEOREM: Sum of exterior angles of any convex polygon $= 360°$

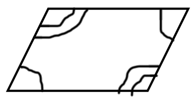
PROPERITES OF PARALLELOGRAMS:

PART 1



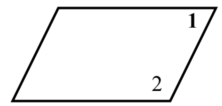
Opposite sides ≅

PART 2



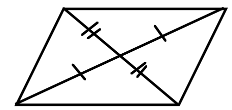
Opposite Angles ≅

PART 3



All pairs of consecutive angles are supplementary

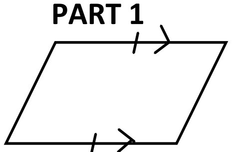
PART 4



Diagonals bisect each other

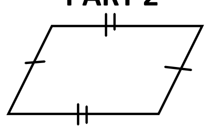
CONDITIONS FOR PARALLELOGRAMS:

PART 1



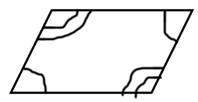
A pair of opposite sides ≅ and parallel

PART 2



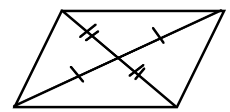
Both pairs of opposite sides ≅

PART 3



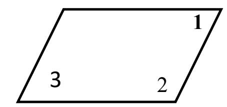
Both pair opposite angles ≅

PART 4



Diagonals bisect

PART 5



An angle is supplementary to both of its consecutive angles

PROPERTIES OF RECTANGLES :

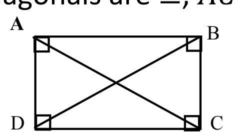
If a quadrilateral is a rectangle, then it is:

PART 1

Also a parallelogram

PART 2

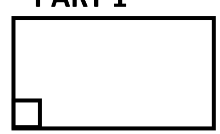
Its diagonals are ≅, $AC \cong BD$



CONDITIONS FOR RECTANGLES:

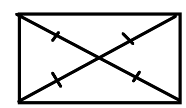
A parallelogram is a rectangle IF

PART 1



If it has at least 1 right angle

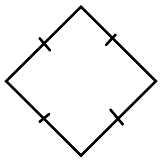
PART 2



If its diagonals are ≅

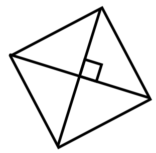
PROPERTIES OF RHOMBUSES: If a quadrilateral is a rhombus, THEN

PART 1



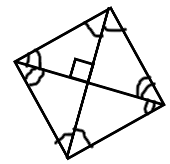
then all sides are congruent

PART 2



then its diagonals are perpendicular ⊥

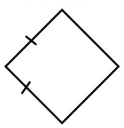
PART 3



then its diagonals are bisect the angles

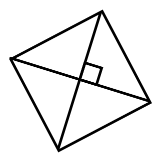
CONDITIONS FOR RHOMBUSES: A parallelogram is a rhombus IF

PART 1



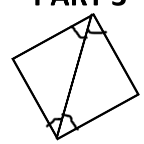
one pair of consecutive sides ≅

PART 2



if diagonals are ⊥

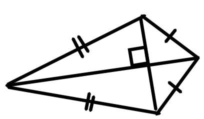
PART 3



if diagonals bisect the angles

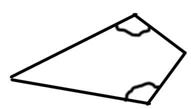
PROPERTIES OF KITES: If a quadrilateral is a kite, THEN

PART 1



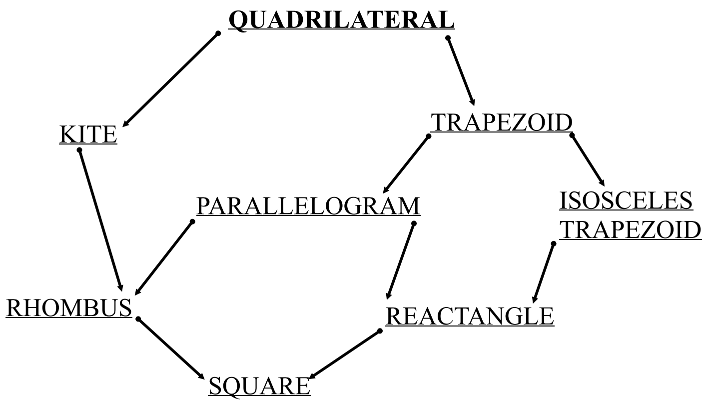
diagonals are ⊥

PART 2



A pair of opposite angles are ≅

QUADRILATERAL HIERARCHY:



PROPERTIES OF ISOSCELES TRAPEZOIDS: If a quadrilateral is an isosceles trapezoid, THEN

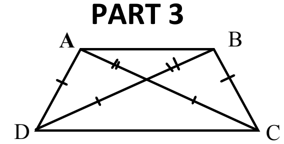
PART 1

Each pair of base angles is ≅

PART 2

If a trapezoid has one pair of base angles ≅, then it is isosceles

PART 3

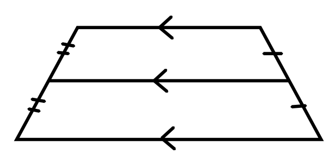


Its diagonals are ≅

$\overline{AC} \cong \overline{BD}$

TRAPEZOID MIDSEGMENT THEOREM:

The midsegment of a trapezoid is parallel to each base



The length of the midsegment is $\frac{1}{2}$(sum of the 2 bases)

$$= \frac{1}{2}(b_1 + b_2)$$