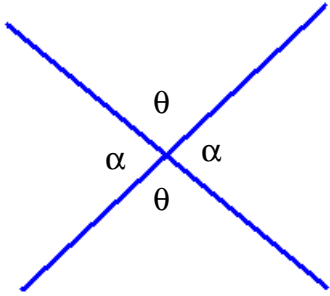
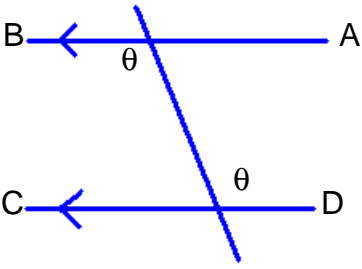
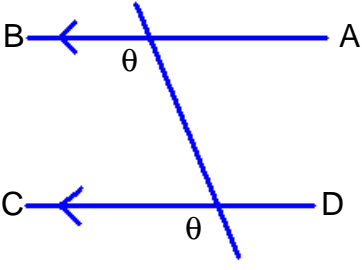
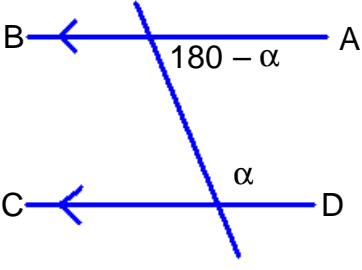
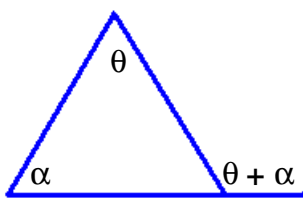
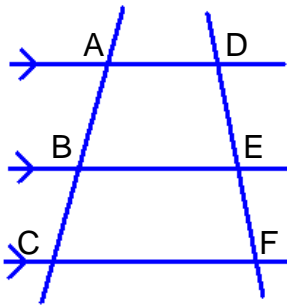
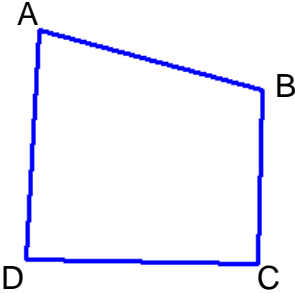
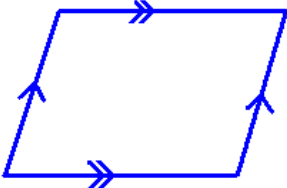
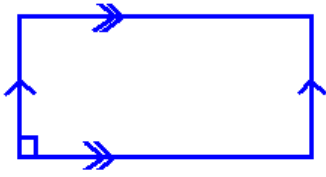


# Geometry Summary

Picture	Rule
<b>Basic Geometry</b>	
	<p>Vertically Opposite angles are equal.</p> <p><i>(Vert Opp ∠'s are =)</i></p>
	<p>Alternate angles are equal when AB is parallel to CD.</p> <p><i>(Alt ∠'s are = when AB    CD)</i></p> <ul style="list-style-type: none"> <li>This can prove that two lines are parallel</li> </ul>
	<p>Corresponding angles are equal when AB is parallel to CD.</p> <p><i>(Corres. ∠'s are = when AB    CD)</i></p> <ul style="list-style-type: none"> <li>This can prove that two lines are parallel</li> </ul>
	<p>Co-interior angles are supplementary when AB is parallel to CD.</p> <p><i>(Co-int. ∠'s = 180° when AB    CD)</i></p> <ul style="list-style-type: none"> <li>This can prove that two lines are parallel.</li> </ul>
	<p>The exterior angle of a triangle is equal to the sum of the opposite interior angles.</p> <p><i>(Ext. ∠ of ∠ is = to sum of opp int. ∠'s)</i></p>

<p><b>Congruent Triangles</b></p>	<p>There are four ways to prove that two triangles are congruent.</p> <ul style="list-style-type: none"> <li>• SSS – Three equal sides</li> <li>• SAS – Two sides and the included angle are equal</li> <li>• AAS – Two angles and a side are equal</li> <li>• RHS – The right angle is common for both triangles and the hypotenuse and another side are equal.</li> </ul>
<p><b>Similar Triangles</b></p>	<p>There are three ways to prove similar triangles</p> <ul style="list-style-type: none"> <li>• 3 equal angles (3 = ∠'s)</li> <li>• 3 sides in proportion (3 sides in prop.)</li> <li>• Two pairs of sides in proportion and the included angles are equal. (2 sides in prop &amp; incl. ∠'s are =)</li> </ul>
	<p><b>Ratio of Intercepts:</b> This occurs when AD    BE    CF.</p> $\frac{AB}{BC} = \frac{DE}{EF}$
	<p>A quadrilateral is a four sided figure.</p> <ul style="list-style-type: none"> <li>• The interior angle sum of a quadrilateral is 360°.</li> </ul>
	<p><b>Parallelogram:</b> A parallelogram is a quadrilateral with opposite sides parallel.</p> <p><b>Properties:</b></p> <ul style="list-style-type: none"> <li>• Opposite sides of a parallelogram are equal</li> <li>• Opposite angles of a parallelogram are equal</li> <li>• Diagonals in a parallelogram bisect each other.</li> <li>• Each diagonal bisects the parallelogram into two congruent triangles.</li> </ul> <p><b>Tests:</b></p> <ul style="list-style-type: none"> <li>• Both pairs of opposite sides are equal</li> <li>• Both pairs of opposite angles are equal</li> <li>• One pair of sides is both equal and parallel</li> <li>• The diagonals bisect</li> </ul> <p><b>Area:</b> <math>A = bh</math></p>

**Rectangle:**

A rectangle is a parallelogram with a right angle.

**Properties:**

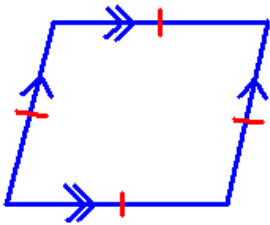
- Opposite sides of a parallelogram are equal
- Opposite angles of a parallelogram are equal
- Diagonals in a parallelogram bisect each other.
- Each diagonal bisects the parallelogram into two congruent triangles.
- The diagonals are equal

**Tests:**

- The diagonals are equal
- Four right angles

**Area:**

$$A = lb$$

**Rhombus:**

A rhombus is a parallelogram with a pair of adjacent sides equal.

**Properties:**

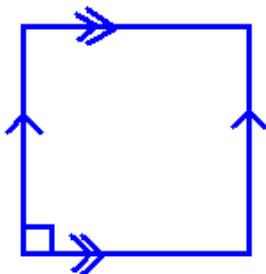
- Opposite sides of a parallelogram are equal
- Opposite angles of a parallelogram are equal
- Diagonals in a parallelogram bisect each other.
- Each diagonal bisects the parallelogram into two congruent triangles.
- Diagonals bisect at  $90^\circ$
- Diagonals bisect the angles of the rhombus.

**Tests:**

- All sides are equal
- Diagonals bisect at  $90^\circ$

**Area:**

$$A = \frac{1}{2} xy \quad (\text{where } x \text{ \& } y \text{ are diagonals})$$

**Square:**

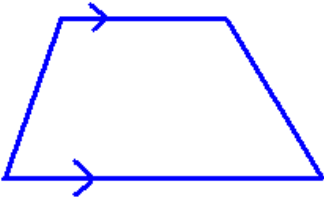

A square is a rectangle with a pair of adjacent sides equal.

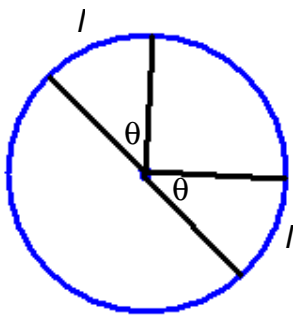
**Properties:**

- Opposite sides of a parallelogram are equal
- Opposite angles of a parallelogram are equal
- Diagonals in a parallelogram bisect each other.
- Each diagonal bisects the parallelogram into two congruent triangles.
- The diagonals are equal
- Diagonals are perpendicular
- Diagonals make angles of  $45^\circ$  with the sides.

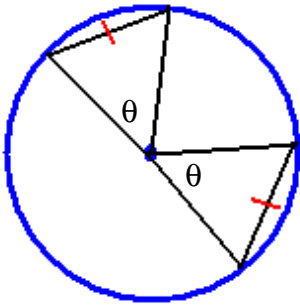
**Tests:**

- 4 equal sides and a right angle.

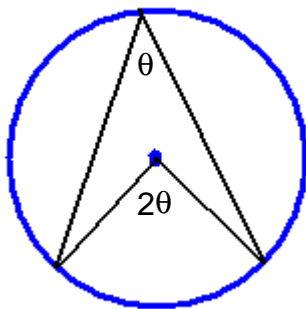
	<b>Area:</b> $A = x^2$		
	A trapezium is a quadrilateral with one pair of sides parallel. <b>Area:</b> $A = \frac{1}{2} h(a + b)$		
	A kite is a quad with two pairs of adjacent sides equal.		
<b>Polygons</b>	<b>Polygons:</b> <ul style="list-style-type: none"> <li>• A regular polygon has all sides and all interior angles equal.</li> <li>• The sum of the interior angles is:  <math>S = (n - 2) \times 180^\circ</math></li> <li>• The sum of the exterior angles of any regular polygon is <math>360^\circ</math></li> </ul>		
<b>Areas</b>	<b>Area of a Triangle:</b> $A = \frac{1}{2} bh$  <b>Area of a Circle:</b> $A = \pi r^2$		
<b>Surface Areas &amp; Volumes</b>	<b>Shape</b>	<b>Surface Area</b>	<b>Volume</b>
	Rectangular Prism	$2(lb + bh + lh)$	$lbh$
	Cube	$6x^2$	$x^3$
	Cylinder	$2\pi r^2 + 2\pi r h$	$\pi r^2 h$
	Sphere	$4\pi r^2$	$\frac{4}{3} \pi r^3$
	Cone	$\pi r^2 + \pi rl$	$\frac{1}{3} \pi r^2 h$
	<b>Volume of any Prism:</b> $V = Ah$  <b>Volume of any Pyramid:</b> $V = \frac{1}{3} Ah$		
<b>Circle Properties</b>			



- Equal arcs subtend equal angles at the centre of the circle.  
( = arcs subtend =  $\angle$ 's )
- Equal angles subtended at the centre cut off equal arcs.  
( =  $\angle$ 's subtend = arcs )

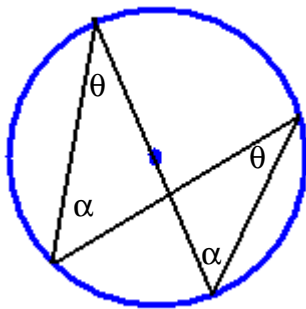


- Equal chords subtend equal angles at the centre of the circle.  
( = chords subtend =  $\angle$ 's )
- Equal angles subtended at the centre cut off equal chords.  
( =  $\angle$ 's subtend = chords )



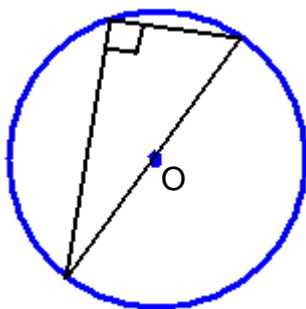
The angle at the centre of a circle is twice the angle at the circumference subtended by the same arc.

( $\angle$  @ centre is twice  $\angle$  @ circum.)



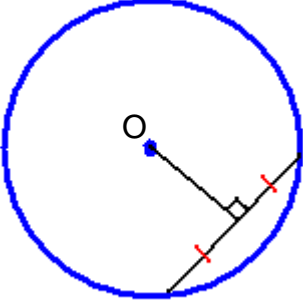
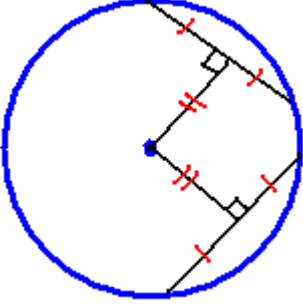
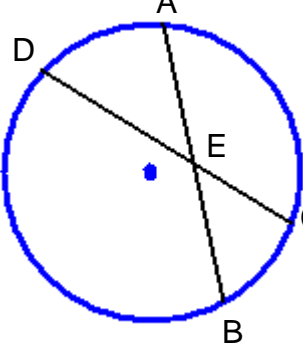
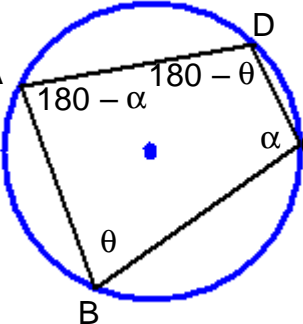
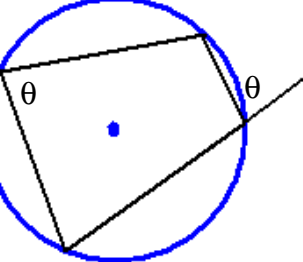
Angles in the same segment of a circle are equal.

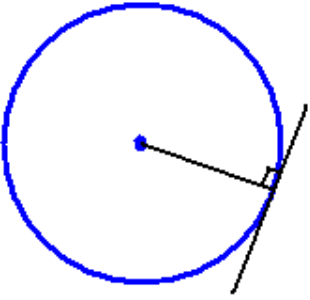
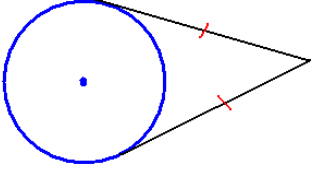
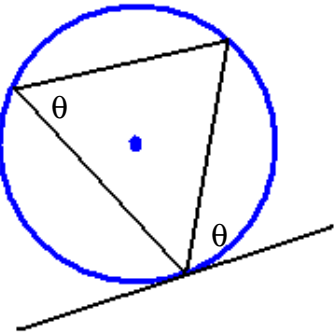
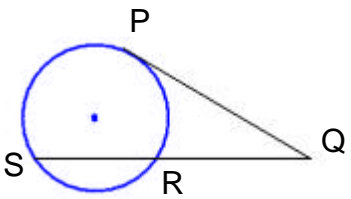
( $\angle$ 's in same segment are = )



The angle in a semi-circle is a right angle.

( $\angle$  in a semi-circle is  $90^\circ$ )

	<ul style="list-style-type: none"> <li>• A perpendicular line from the centre of a circle to a chord bisects the chord. (<math>\perp</math> line from centre bisects chord)</li> <li>• A line from the centre of a circle that bisects a chord is perpendicular to the circle. (line from centre that bisects chord is <math>\perp</math>)</li> </ul>
	<ul style="list-style-type: none"> <li>• Equal chords are equidistant from the centre of the circle. (= chords are = dist. from centre)</li> <li>• Chords that are equidistant from the centre of the circle are equal. (chords that are = dist. from centre are =)</li> </ul>
	<p>The products of intersecting chords are equal. (Products of intersecting chords are =)</p> $AE \times EB = DE \times EC$
	<p><b>Cyclic Quadrilateral:</b> A cyclic quadrilateral is a figure whose 4 vertices are concyclic points.</p> <ul style="list-style-type: none"> <li>• The opposite angles of a cyclic quad are supplementary. (Opp <math>\angle</math>'s in cyclic quad = <math>180^\circ</math>)</li> <li>• If the opposite angles of a quadrilateral are supplementary then the quadrilateral is cyclic.</li> </ul>
	<ul style="list-style-type: none"> <li>• The exterior angle of a cyclic quadrilateral is equal to the opposite interior angle. (Ext <math>\angle</math> in cyclic quad is = opp int <math>\angle</math>)</li> </ul>

	<ul style="list-style-type: none"> <li>The tangent to a circle is perpendicular to the radius drawn from the point of contact. (Tangent to circle is <math>\perp</math> to radius drawn from point of contact)</li> <li>The line perpendicular to the radius at the point where it meets the circle is a tangent to the circle at that point.</li> </ul>
	<p>Tangents to a circle from an exterior point are equal. (Tangents to circle from ext point are <math>=</math>)</p>
	<p>The angle between a tangent and a chord through the point of contact is equal to the angle in the alternate segment. (<math>\angle</math> between tangent and chord is <math>=</math> to <math>\angle</math> in alt segment)</p>
	$PQ^2 = QR \times QS$