

# SOL Formulas to Memorize

## Put calculator in degree mode!!

### Coordinate Formulas

midpoint – plot in a coordinate grid – count half the squares  
 distance – plot in a coordinate grid – Pythagorean theorem

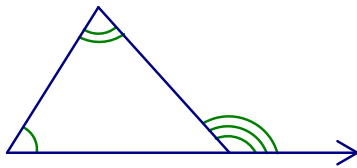
### Conditional Statements

converse -- flip  
 inverse -- opposite  
 contrapositive -- flip / opposite  
 biconditional -- "if and only if"

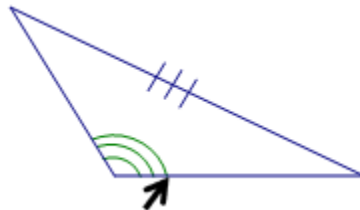
### Triangles

Triangle inequality – small + small > big

sum = 180°



int ∠ + int ∠ = ext ∠



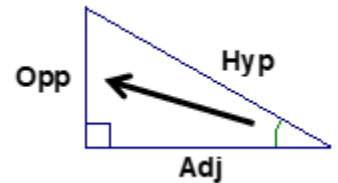
biggest ∠ opposite longest side

### Trigonometry -- SOH CAH TOA

$$\sin \angle = \frac{\text{opp}}{\text{hyp}}$$

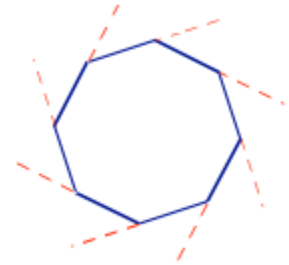
$$\cos \angle = \frac{\text{adj}}{\text{hyp}}$$

$$\tan \angle = \frac{\text{opp}}{\text{adj}}$$



### Polygons

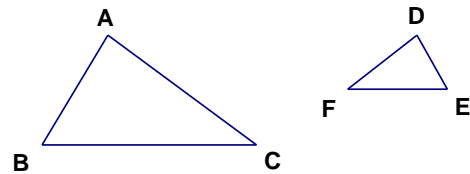
sum of all int ∠'s $(n-2) \cdot 180$	sum of all ext ∠'s $360^\circ$
each interior ∠ $180^\circ - \text{ext } \angle$	each exterior ∠ $\frac{360}{n}$



interior ∠ + exterior ∠ = 180°

### Similar – think ratios and proportions

small shape →  $\frac{\text{part1}}{\text{part1}} = \frac{\text{part2}}{\text{part2}}$  (cross multiply)  
 big shape →



$\triangle ABC \sim \triangle DEF$

scale factor (s.f.)

$$\frac{a}{b}$$

ratio of area/surface areas (ROA/ROSA)

$$\frac{a^2}{b^2}$$

ratio of volumes (ROV)

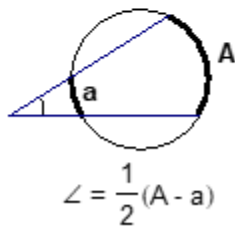
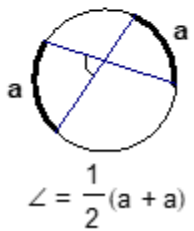
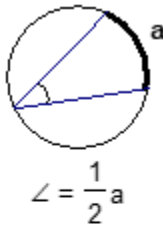
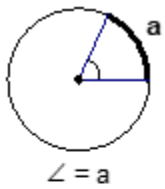
$$\frac{a^3}{b^3}$$

# Symbolic Notation

Conditional	$p \rightarrow q$	$p$ and $q$	$p \wedge q$
Converse	$q \rightarrow p$	$p$ or $q$	$p \vee q$
Inverse	$\sim p \rightarrow \sim q$	$(\rightarrow)$ means "implies"	
Contrapositive	$\sim q \rightarrow \sim p$	$(\sim)$ means negation – "not $p$ " is written $\sim p$	
Biconditional	$p \leftrightarrow q$	$(\therefore)$ means "therefore"	

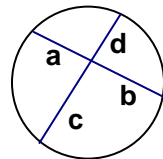
## Circles

(angles)

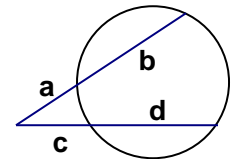


(segments)

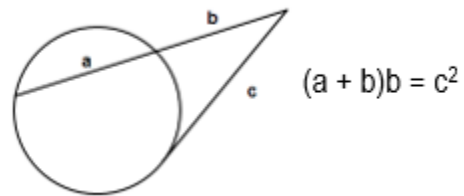
POP



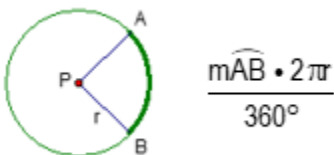
WE = WE



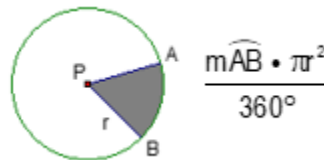
WE = T<sup>2</sup>



(arc length)



(area of sector)

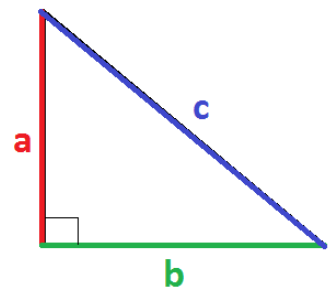


Equation of a circle:  $(x - h)^2 + (y - k)^2 = r^2$  where  $(h, k)$  represents the center and  $r =$  radius

## Pythagorean Theorem

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

Where  $c$  is the hypotenuse (longest side, across from the right angle)

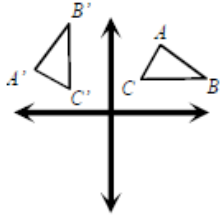


## Rotations

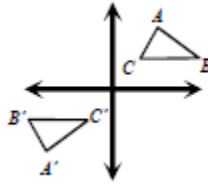
### Rules for Counterclockwise Rotations about the Origin

When a point,  $(a, b)$ , is rotated counterclockwise about the origin...

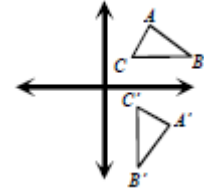
$$90^\circ, (x, y) \rightarrow (-y, x)$$



$$180^\circ, (x, y) \rightarrow (-x, -y)$$

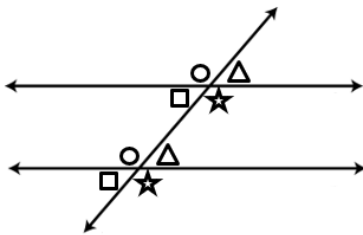


$$270^\circ, (x, y) \rightarrow (y, -x)$$

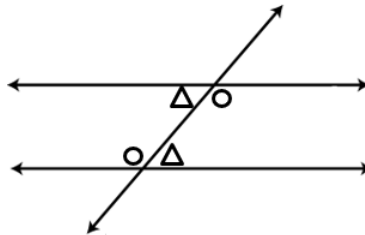


## Parallel line relationships

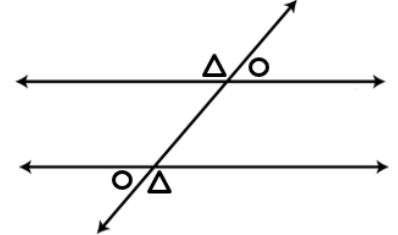
Corresponding angles (=)



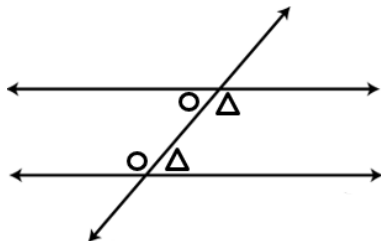
Alternate interior angles (=)



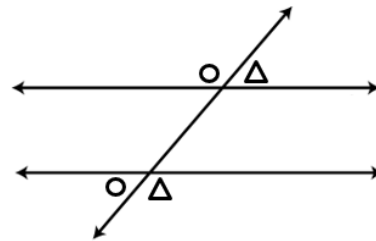
Alternate exterior angles (=)



Same side interior angles ( $180^\circ$ )

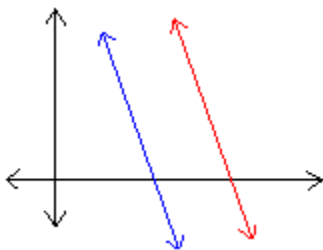


Same side exterior angles ( $180^\circ$ )



## Slope

Parallel lines – same slope



Perpendicular lines – slope are opposite reciprocals

example:  $\frac{2}{3}$  and  $-\frac{3}{2}$

