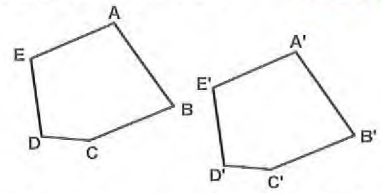
Unit 1 and 2 Review

Congruence

ABCDE ≅ A'B'C'D'E'

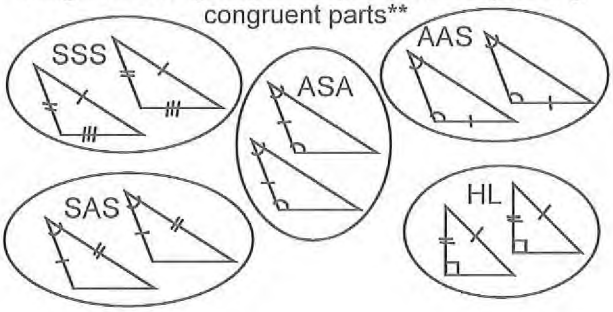


Two figures are congruent if they have the same shape and same size. Corresponding angles are congruent and corresponding sides are congruent.

Two figures are congruent if and only if one figure can be obtained from the other figure by a sequence of rigid motions (translations, reflections, rotations).

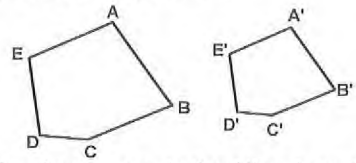
Triangle Congruence Theorems

help us to determine if two triangles are congruent using only three pair of corresponding congruent parts



Similarity

ABCDE ~ A'B'C'D'E'



Two figures are similar if they have the same shape and a different size. Corresponding angles are congruent and corresponding sides are proportional.

Two figures are similar if and only if one figure can be obtained from the other figure by a sequence of similarity transformations (a rigid motion followed by a dilation).

Dilation & Scale Factor

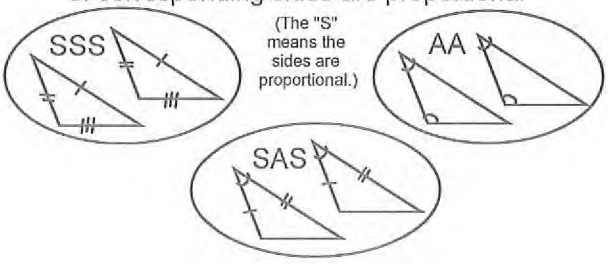
A **dilation** is a type of transformation that changes the size of a figure. The scale factor measures how much larger or smaller the new figure is. A dilation maps (x, y) to (kx, ky) where k is the scale factor.

scale factor greater than 1, the figure is made larger
scale factor between 0 and 1, figure made smaller
scale factor is 1, the figure does not change

$$\text{scale factor} = \frac{\text{NEW}}{\text{ORIGINAL}}$$

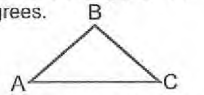
Triangle Similarity Theorems

help us to determine if two triangles are similar even if we don't know for a fact that all pairs of corresponding angles are congruent and all pairs of corresponding sides are proportional



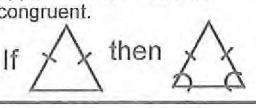
Triangle Theorems

Triangle Sum Theorem: The sum of the angle measures inside of a triangle is 180 degrees.



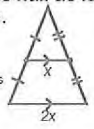
$m\angle A + m\angle B + m\angle C = 180$

Isosceles Triangle Theorem: If two sides of a triangle are congruent, then the angles opposite those sides are congruent.

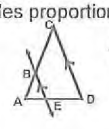


Triangle Midsegment Theorem: A midsegment is parallel to the third side of a triangle and is half as long as the third side.

*A midsegment is a segment whose endpoints are the midpoints of two sides of a triangle.



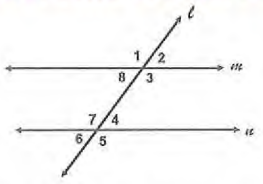
Triangle Proportionality Theorem: If a line parallel to a side of a triangle intersects the other two sides, then it divides those sides proportionally.



$\frac{AB}{CB} = \frac{AE}{ED}$

Unit 1 and 2 Review

Theorems about Lines and Angles



$m \parallel n$

ℓ is a transversal

Vertical Angles are congruent.
$\angle 2 \cong \angle 8$ $\angle 1 \cong \angle 3$ $\angle 5 \cong \angle 7$ $\angle 4 \cong \angle 6$

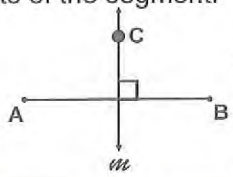
Same Side Interior Angles are supplementary.
$\angle 3 + \angle 4 = 180$ $\angle 7 + \angle 8 = 180$

Alternate Interior Angles are congruent.
$\angle 3 \cong \angle 7$ $\angle 4 \cong \angle 8$

Corresponding Angles are congruent.
$\angle 1 \cong \angle 7$ $\angle 6 \cong \angle 8$ $\angle 2 \cong \angle 4$ $\angle 3 \cong \angle 5$

Perpendicular Bisector Theorem

If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.



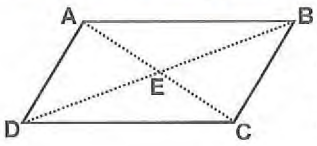
line m is the perpendicular bisector of segment AB

Point C is the same distance from point A as it is from point B

Medians of a Triangle

The point of concurrency for the medians of a triangle is called the centroid. (In other words, the medians of a triangle meet at a point called the centroid.)

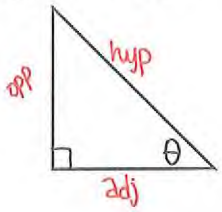
Parallelograms



Opposite sides are congruent.
Opposite angles are congruent.
Consecutive angles are supplementary.
Diagonals bisect each other.

A rectangle is a parallelogram with congruent diagonals. (In a rectangle, diagonals are congruent and they bisect each other.)

The trigonometric ratios sine, cosine, and tangent are defined as ratios of the lengths of the sides in a right triangle with a given acute angle measure.

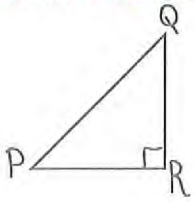


$\sin\theta = \frac{opp}{hyp}$

$\cos\theta = \frac{adj}{hyp}$

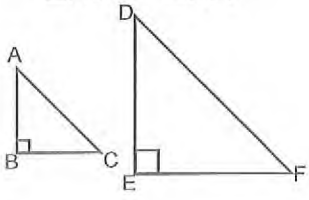
$\tan\theta = \frac{opp}{adj}$

The two acute angles of any right triangle are complementary (add to equal 90 degrees). As a result, if angles P and Q are complementary, $\sin P = \cos Q$ and $\sin Q = \cos P$.



In similar triangles, because corresponding angles are congruent and corresponding sides are proportional, the trigonometric ratios of corresponding angles are equal.

$\Delta ABC \sim \Delta DEF$



$\sin A = \sin D$
$\cos A = \cos D$
$\tan A = \tan D$

$\sin C = \sin F$
$\cos C = \cos F$
$\tan C = \tan F$

Unit 1 and 2 Review

To **solve a right triangle** means to find the lengths of all 3 sides and to find the measures of all 3 angles.

In right triangle application problems, DRAW A PICTURE and use the picture to find what you have been asked to find.

Finding missing side of a right triangle:

a) When given two sides, use Pythagorean Theorem.

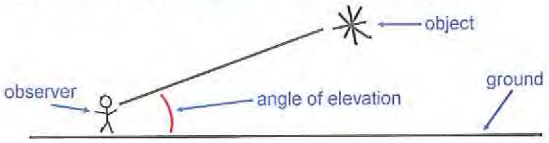
b) When given 1 side and 1 acute angle, decide on the trig ratio and set up an equation using that trig ratio. Solve for the missing side.

Finding missing angle of a right triangle:

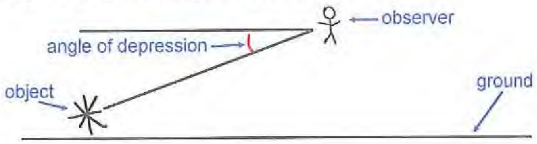
a) When given 1 acute angle, subtract the sum of the measures of those two angles from 180.

b) When given 2 sides, decide on the trig ratio and set up an equation using that trig ratio. Find the inverse trig trig ratio.

Angle of Elevation: The angle above horizontal that an observer must look to see an object that is higher than the observer.



Angle of Depression: The angle below horizontal that an observer must look to see an object that is lower than the observer.



In the same situation, the angle of elevation and the angle of depression are congruent.