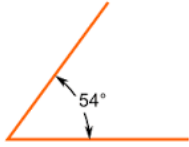
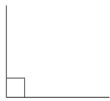


Unit 4 – Similarity & Congruence
Classifying Triangles

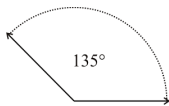
- Classify by the Angles
 - Acute



- Right



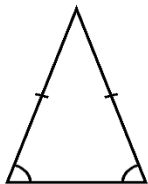
- Obtuse



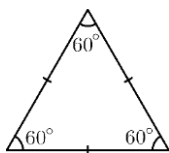
- Classify by the Sides
 - Scalene



- Isosceles



- Equilateral



Example: A triangle can be any of the following combinations:

Scalene Acute

Equilateral Acute

Scalene Right

Equilateral Right

Scalene Obtuse

Equilateral Obtuse

Isosceles Acute

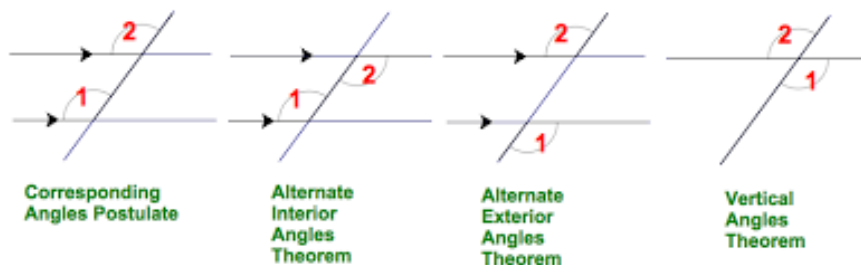
Isosceles Right

Isosceles Obtuse

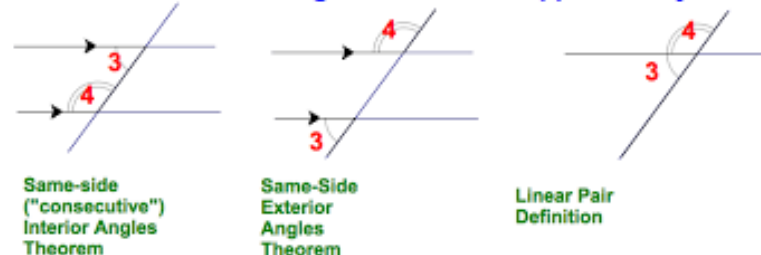
*Name the triangle by its sides and by its angles.

Angle Pair Relationships

$m\angle 1 = m\angle 2$ Angles 1 and 2 are congruent.



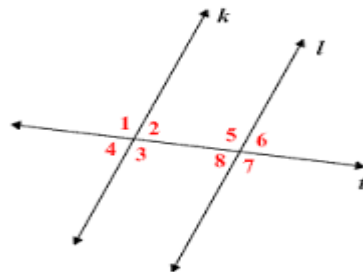
$m\angle 3 + m\angle 4 = 180$ Angles 3 and 4 are supplementary



Transversals

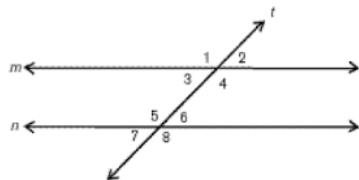
Example: The $m\angle 1 = 110^\circ$. Find the measures of the other seven angles.

$$\begin{aligned} m\angle 2 &= 70^\circ & m\angle 5 &= 110^\circ \\ m\angle 3 &= 110^\circ & m\angle 6 &= 70^\circ \\ m\angle 4 &= 70^\circ & m\angle 7 &= 110^\circ \\ & & m\angle 8 &= 70^\circ \end{aligned}$$

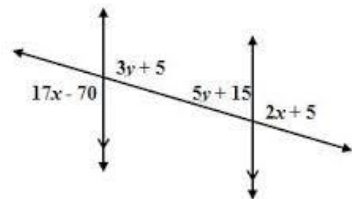


Some for you to try:

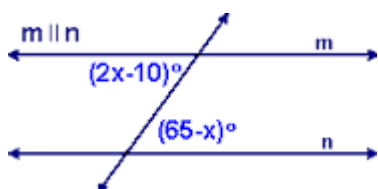
- In the diagram, $m\angle 4 = 130^\circ$. Find the measure of the other seven angles.



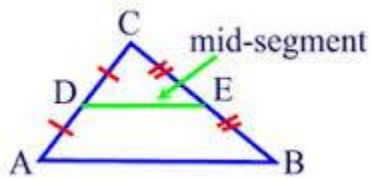
- Use the diagram to solve for x and y .



- Solve for x .

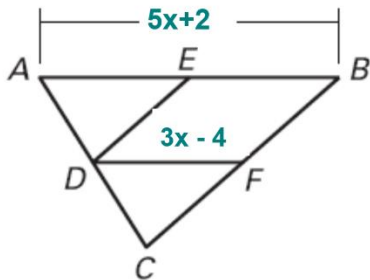


Midsegments



- The midsegment is a segment that connects the midpoints of two sides of a triangle.
- Every triangle has 3 midsegments.
- Each midsegment is parallel to its third side (the side that isn't connected to the midsegment).
- The midsegment is half as long as its parallel side.

Example: Solve for x .

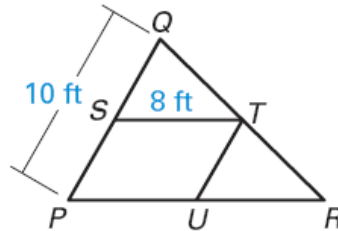


I know that \overline{DE} is double the length of \overline{AB} , so I can set up this equation:

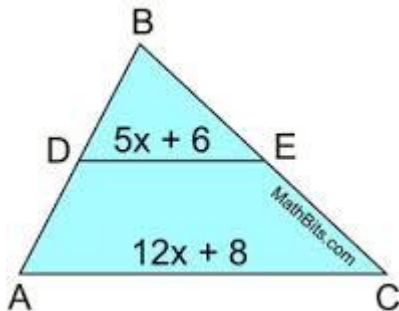
$$\begin{aligned} 2 * (3x - 4) &= 5x + 2 \\ 6x - 8 &= 5x + 2 \\ x &= 10 \end{aligned}$$

Some for you to try:

4. Find the lengths of \overline{TU} and \overline{PR} .



5. Solve for x .



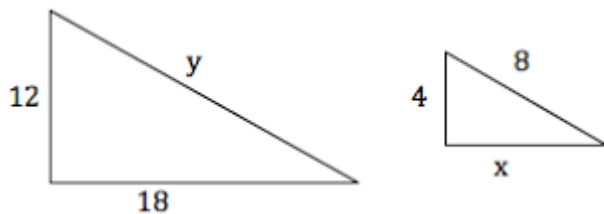
6. Use the diagram in #15 and your answer for x to find the lengths of \overline{DE} and \overline{AC} .
7. Use what you know about midsegments to PROVE that you are correct. (make sure your lengths make sense)

Triangle Similarity

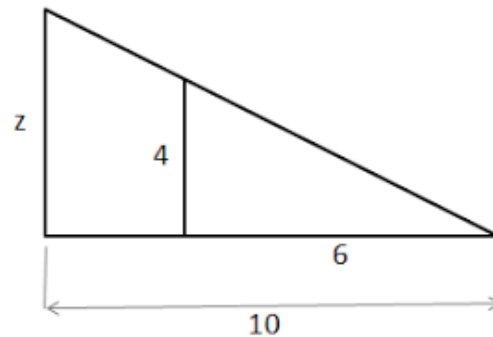
- Proving Similarity
 - Side-Side-Side (SSS): When 3 sides of a triangle are PROPORTIONAL to 3 sides of another triangle
 - Side-Angle-Side (SAS): When 2 sides of one triangle are proportional to 2 sides of another triangle and their included angle is congruent
 - Angle-Angle (AA): When 2 angles in one triangle are congruent to corresponding 2 angles in another triangle
- Finding Missing Sides
 - Use ratios to find missing sides of a triangle once you have proved they are similar

Ex: Find the missing sides:

EX 1:



EX 2:

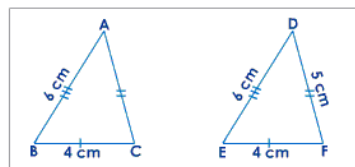
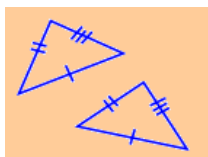


Triangle Congruency

- Isosceles Triangle Theorem
 - Says that if you have an isosceles triangle (two sides of the triangle are congruent), then the opposite angles of those congruent sides are congruent to each other.
- Corollary to the Isosceles Triangle Theorem
 - Corollary means “flipped around”
 - Says that if you have two angles congruent to each other, then the sides opposite of those angles are congruent.
- CPCTC
 - Corresponding Parts of Congruent Triangles are Congruent
 - Basically says that if you have two congruent triangle, then the corresponding sides and corresponding angles are congruent.
- Proving Congruence
 - Once you use the theorems above to find out as much as you can about the triangles in your problem, use the following 5 congruency theorems to prove yourself.

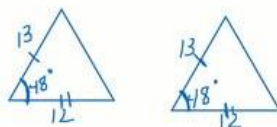
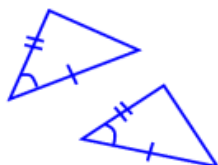
- Side – Side – Side

- SSS

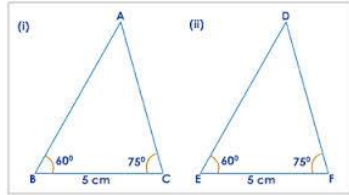
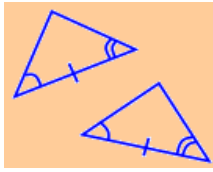


- Side – Angle – Side

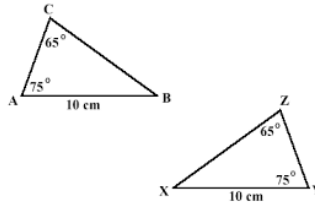
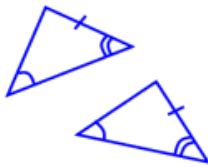
- SAS



- Angle – Side – Angle
 - ASA

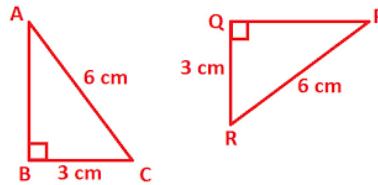
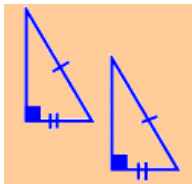


- Angle – Angle – Side
 - AAS

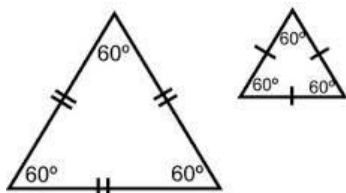


- Hypotenuse – Leg
 - HL

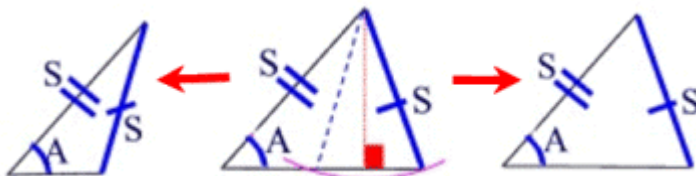
- Remember: This one only works with RIGHT triangles!!!!



- Also → remember you can't use AAA or SSA to prove congruence of two triangles. Only the ones above work!!!



PROOF that AAA doesn't work...both of these triangles have the same angles, but different sides.

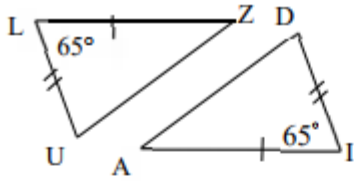


PROOF that SSA doesn't work....basically you can make an isosceles triangle inside the bigger one and then two triangles form that have ASS but the triangles aren't congruent.

USE YOUR UNIT 4 PORTFOLIO FOR LOTS OF PRACTICE PROVING CONGRUENCY

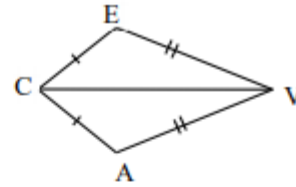
Fill in the proofs to prove congruency of the below triangles:

1.



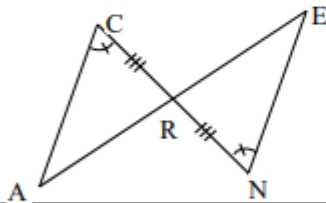
Statement	Reason
$\overline{LZ} \cong \overline{AI}$	
$\angle L \cong$ _____	
$\overline{LU} \cong$ _____	
$\Delta LUZ \cong$ _____	

2.



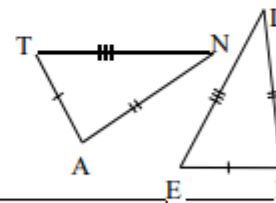
Statement	Reason
$\overline{CE} \cong$ _____	
$\overline{EV} \cong$ _____	
_____ \cong _____	
$\Delta CAV \cong$ _____	

3.



Statement	Reason
$\angle C \cong$ _____	
$\overline{CR} \cong$ _____	
_____ \cong _____	
$\Delta ARC \cong$ _____	

4.



Statement	Reason
$\overline{TA} \cong$ _____	
$\overline{TN} \cong$ _____	
_____ \cong _____	
$\Delta ANT \cong$ _____	