# CH.6, L2 – DISCOVERING CONGRUENT TRIANGLES

Objective: Given side lengths and/or angle measures of a triangle, SWBAT discover the specific combinations of side lengths and angle measures that will create two congruent triangles by applying transformations and the Definition of Congruent Triangles

Think About It: Trace ΔRST, below, onto a piece of tracing paper. Then trace ΔWXY, below, onto a *separate* piece of tracing paper Be sure to label your vertices! Are the two triangles congruent? If so, write a congruence statement for the triangles. If not, explain why.
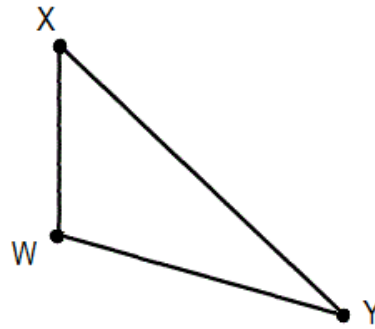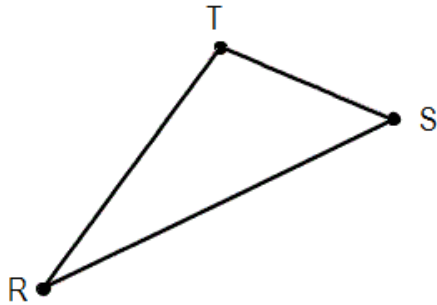
The two triangles _____ congruent because _____

_____

_____

_____

Old Big Idea:

Partner Practice Task Directions:

- You and your partner will each draw five different triangles given guidelines about side lengths and angle measurements.

- For each one, you and your partner will construct your triangles independently and then prove if they are congruent or not using tracing paper or transparencies to show that they can be mapped to each other with rigid transformations.

- Some triangles are going to be more difficult to draw and require specific tools. Read the directions carefully to ensure you are creating an accurate triangle that fits the description.

- After you have completed all five triangle situations, you and your partner will answer the synthesis questions and prepare to discuss them with the entire class.

CFS   1
1. Triangles are accurately created and annotated with condition given
2. Triangles are proven to be congruent or not using rigid transformations
3. Conditional statement is written (If _____, then _____.)

Triangle #1: *Given two side lengths*
- Construct triangle $\triangle ABC$ so that $\overline{AB} = 3\ inches$ and $\overline{BC} = 2\ inches$.
- Complete the triangle by connecting the endpoints A and C
- Compare your triangle to your neighbor's and determine if they are congruent.

Conditional statement: If the _____ _____ of triangles are congruent, then the triangles are

_____.

Triangle #2: *Given three side lengths*
- In your materials, you have three strips of paper that measure 2 inches, 3 inches, and 4 inches.
- Arrange the thin strips of paper into a triangle by connecting the endpoints of the thin strips and transfer this triangle (carefully and accurately) to your paper.
  - Hint – It might help to make a mark at each vertex of the triangle with the thin strips of paper and then draw the line segments between them.
- Compare your triangle to your neighbor's and determine if they are congruent.

Conditional statement: If the _____ _____ of triangles are congruent, then the triangles are

_____.

CFS   2
1. Triangles are accurately created and annotated with condition given
2. Triangles are proven to be congruent or not using rigid transformations
3. Conditional statement is written *(If _____, then _____.)*

Triangle #3: *Given three angles*
- Draw a line segment of any length.
- Using the endpoint of the line segment, create a triangle that has angles that measure 70°, 60°, and 50°
    - Hint – because the interior angles of a triangle are equal to 180 degrees, if you draw two angles, the third should be equal to the angle you haven't used yet (check it with your protractor).
- Compare your triangle to your neighbor's and determine if they are congruent.

Conditional statement: If the _____ _____ of triangles are congruent, then the triangles are
_____.

**Triangle #4:** *Given two sides and the angle between them*
- Draw a triangle ΔABC such that $\overline{AB} = 2\ inches, \overline{BC} = 3\ inches$, and the angle between them is $\angle ABC = 80°$
- Compare your triangle to your neighbor's and determine if they are congruent.

Conditional statement: If the _____ _____ and the _____ _____ of
triangles are congruent, then the triangles are _____.

CFS   3
1. Triangles are accurately created and annotated with condition given
2. Triangles are proven to be congruent or not using rigid transformations
3. Conditional statement is written *(If _____, then _____.)*

Triangle #5: *Given two sides and an angle not between them*

- Triangle $\triangle ABC$ was started below for you.
- Line segment $\overline{AB}$ was drawn for you and is 2.5 inches long.
- Vertex C is somewhere on the dotted line such that $\overline{BC}$ is 2 inches long
  - Because the dotted line is given, it known that $\angle BAC$ is 40°
- Draw line segment $\overline{BC}$ such that C is on the dotted line and compare with your partner.
- If you both have congruent triangles, discuss if there is another triangle that can be created given this information.
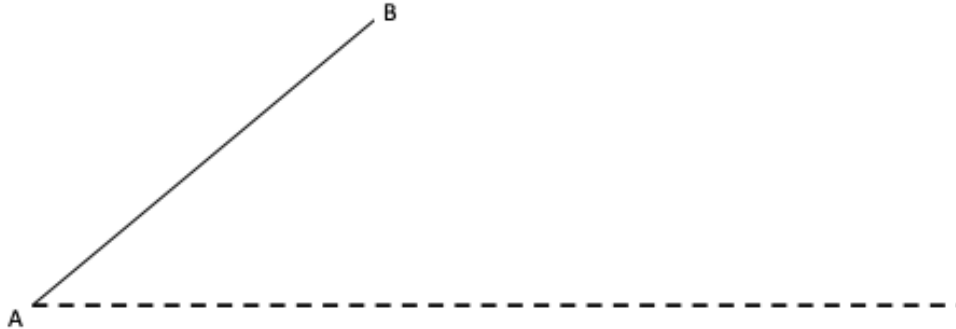
Conditional statement: If the _____ _____ and the _____ _____ of triangles are congruent, then the triangles are _____.

Synthesis Questions:

- What combinations of sides and angles did not produce a unique triangle?

  The triangles <u>can/cannot</u> be proven congruent if _____

  or _____.

- What general rule(s) could you write that would allow you to determine if two triangles were congruent without using rigid transformations?

  The triangles <u>can/cannot</u> be proven congruent knowing only _____,

  _____, or _____.

New Big Idea:

1. Triangles are accurately created and annotated with condition given
2. Triangles are proven to be congruent or not using rigid transformations
3. Conditional statement is written *(If _____, then _____.)*

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