**Activity 4.3.1 Triangle Similarity Conjectures**

Recall that in similar polygonscorresponding sides are proportional and corresponding angles are congruent.

In the following three tasks you will be deciding if the triangles are similar based on the information given in each task.

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**Task 1** – Work with a partner. Each partner should draw a triangle using a protractor and a ruler.

Step 1: Draw any $∆ABC $so that the $m ∠A=35°$ and $m ∠B=60°$.

Step 2: Measure the lengths of the sides of your triangle (in millimeters) and find the measure of $∠$ *C*. Record you answers below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Side $\overbar{AB}$ | Side $\overbar{BC}$ | Side $\overbar{BC}$ | $$m ∠A$$ | $$m ∠B$$ | $$m ∠C$$ |
| Your Triangle |  |  |  | $$35°$$ | $$60°$$ |  |
| Partner’s Triangle |  |  |  | $$35°$$ | $$60°$$ |  |

|  |  |
| --- | --- |
| 1. How did you find m $∠C$? Is your answer for $m ∠C$ the same as your partner’s?
2. Your partner probably has a triangle with different side lengths. Determine if the triangles are similar.
3. At the start of the investigation what was the given information and what were you able to conclude?
4. What would be a good name for this conjecture?
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**Task 2**

1. Create two triangles with the information given below. Your Ziploc bag contains premade stick sizes for the side lengths. Use a protractor to measure the angles of the resulting triangles.
* $∆ABC, with AB=4 in and BC=3 in and AC=2 in$
* $∆DEF, with DE=6 in and EF=4.5 in and DF=3 in$
1. Record the missing measurements in the table below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| $$∆ABC$$ | $$AB=4$$ | $$BC=3$$ | $$AC=2$$ | $m∠A=$  | $$m∠B=$$ | $$m∠C=$$ |
| $$∆DEF$$ | $$DE=6$$ | $$EF=4.5$$ | $$DF=3$$ | $$m∠D= $$ | $$m∠E= $$ | $$m∠F= $$ |

1. Draw a picture to represent $∆ABC$ and $∆DEF$ with the angles and side measurements given. Determine whether the triangles are similar.
2. If the triangles are similar, decide on an appropriate name for the conjecture suggested by this investigation.

**Task 3**

a. Create two triangles with the information given below. Use a protractor to draw the given angles. Your Ziploc bag contains premade stick sizes for the side lengths, or you may use a ruler to draw the sides.

$$∆ABC, with m∠B=35° and AB=6 in and BC=4 in $$

$$∆DEF, with m∠E=35° and DE=3 in and EF=2 in$$

b. Record the missing measurements in the table below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| $$∆ABC$$ | $$AB=6 in$$ | $$BC=4 in$$ | $$AC=$$ | $m∠A=$  | $$m∠B=35°$$ | $$m∠C=$$ |
| $$∆DEF$$ | $DE=3$ $in$ | $$EF=2 in$$ | $$DF=$$ | $$m∠D= $$ | $$m∠E=35°$$ | $$m∠F= $$ |

1. Draw a picture to represent $∆ABC$ and $∆DEF$ with the angle measurements and side lengths in your chart. Determine whether the triangles are similar.

d. If the triangles are similar decide on an appropriate name for the conjecture suggested by this investigation.

**Investigation Questions:**

4. For each task you were given limited information to conclude whether or not the triangles were similar. What is the limited information given for each task? Supply the conjecture name for each that you came up with in each investigation.

Task 1

Task 2

Task 3

5. For task 3 you were given two sides and an angle in a specific order, that order was Side-Angle-Side. Now let’s change the position of the 35° angle in the two triangles.

$$∆ABC, with m∠A=35° and AB=6 in and BC=4 in $$

$$∆DEF, with m∠D=35° and DE=3 in and EF=2 in$$

This order is Side-Side-Angle. Can you conclude that the triangles are still similar? What conclusion can you draw about order of given information when working with sides and angles?

6. Davon asks if there is an Angle-Side-Angle relationship in two triangles. Sonia says we don’t need to conduct that experiment because one of the tasks already proved that there is. What could she mean by that?