## Unit 2 Lesson 9: Side-Side-Side Triangle Congruence

### 1 Dare to Be Different (Warm up)

#### Student Task Statement

Construct a triangle with the given side lengths on tracing paper.



Can you make a triangle that doesn’t look like anyone else’s?

### 2 Proving the Side-Side-Side Triangle Congruence Theorem

#### Student Task Statement



Priya was given this task to complete:

Use a sequence of rigid motions to take onto . Given that segment is congruent to segment , segment is congruent to segment , and segment is congruent to segment . For each step, explain how you know that one or more vertices will line up.

Help her finish the missing steps in her proof:

1. is the same length as , so they are congruent. Therefore, there is a rigid motion that takes to .
2. Apply this rigid motion to triangle . The image of will coincide with  , and the image of will coincide with .
3. We cannot be sure that the image of , which we will call , coincides with  yet. If it does, then our rigid motion takes to , proving that triangle is congruent to triangle . If it does not, then we continue as follows.
4. is congruent to the image of , because rigid motions preserve distance.
5. Therefore,  is equidistant from   and .
6. A similar argument shows that is equidistant from  and  .
7. is the  of the segment connecting  and , because the is determined by 2 points that are both equidistant from the endpoints of a segment.
8. Reflection across the  of , takes   to .
9. Therefore, after the reflection, all 3 pairs of vertices coincide, proving triangles  and   are congruent.



Now, help Priya by finishing a few-sentence summary of her proof. “To prove 2 triangles must be congruent if all 3 pairs of corresponding sides are congruent . . . .”

#### Activity Synthesis

**,** so



### 3 What Else Do We Know For Sure About Parallelograms?

#### Student Task Statement

Quadrilateral is a parallelogram. By definition, that means that segment is parallel to segment , and segment is parallel to segment .

Prove that angle is congruent to angle .

1. Work on your own to make a diagram and write a rough draft of a proof.
2. With your partner, discuss each other’s drafts.
	* What do you notice your partner understands about the problem?
	* What revision would help them move forward?
3. Work together to revise your drafts into a clear proof that everyone in your class could follow and agree with.

#### Images for Activity Synthesis

 is a parallelogram so





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