## Lesson 5: Points, Segments, and Zigzags

* Let’s figure out when segments are congruent.

### 5.1: What's the Point?

If is a point on the plane and is a point on the plane, then is congruent to .

Try to prove this claim by explaining why you can be certain the claim must be true, or try to disprove this claim by explaining why the claim cannot be true. If you can find a counterexample in which the “if” part (hypothesis) is true, but the “then” part (conclusion) is false, you have disproved the claim.

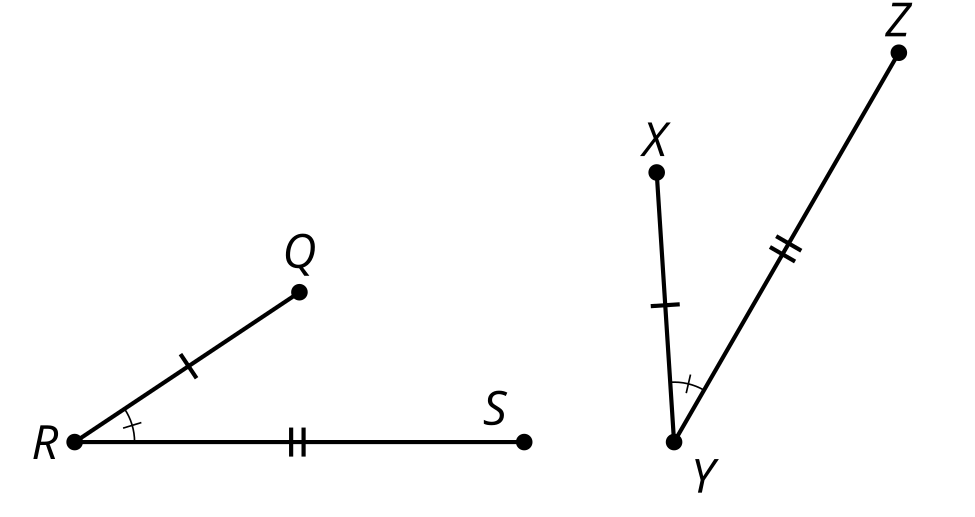
### 5.2: What's the Segment?

Prove the conjecture: If is a segment in the plane and is a segment in the plane with the same length as , then is congruent to .

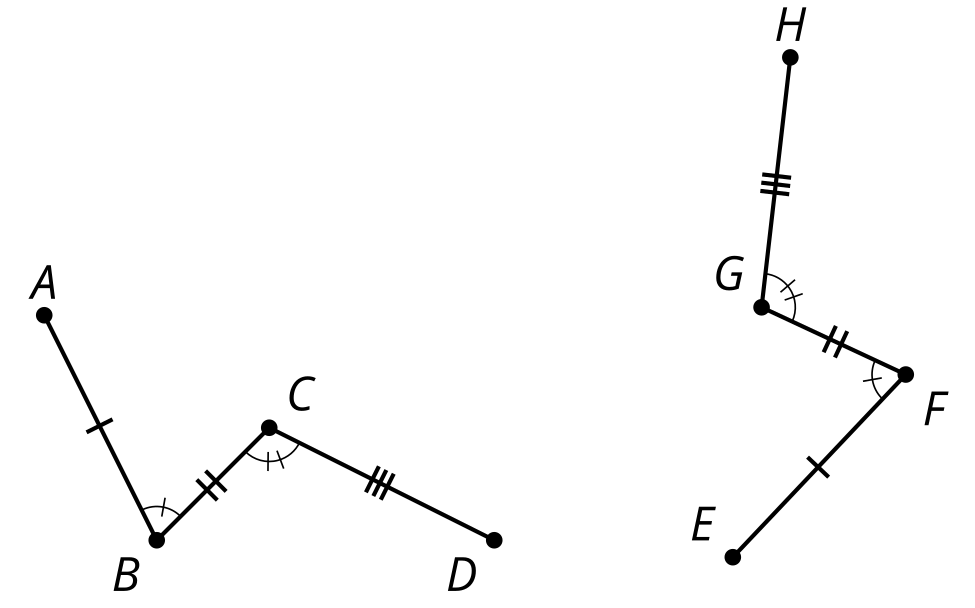
#### Are you ready for more?

Prove or disprove the following claim: “If is a piece of string in the plane, and is a piece of string in the plane with the same length as , then is congruent to .”

### 5.3: Zig Then Zag



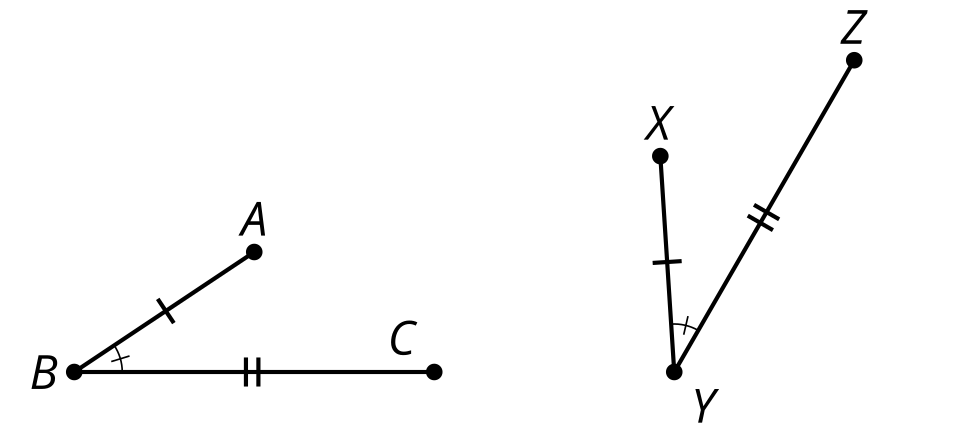
1. Here are some statements about 2 zigzags. Put them in order to write a proof about figures and .
   * 1: Therefore, figure is congruent to figure .
   * 2: must be on ray  since both and  are on the same side of and make the same angle with it at .
   * 3: Segments and are the same length, so they are congruent. Therefore, there is a rigid motion that takes to . Apply that rigid motion to figure .
   * 4: Since points  and  are the same distance along the same ray from , they have to be in the same place.
   * 5: If necessary, reflect the image of figure  across  to be sure the image of , which we will call , is on the same side of as .
2. Take turns with your partner stating steps in the proof that figure is congruent to figure .



### Lesson 5 Summary

If 2 figures are congruent, then there is a sequence of rigid motions that takes one figure onto the other. We can use this fact to prove that any point is congruent to another point. We can also prove segments of the same length are congruent. Finally, we can put together arguments to prove entire figures are congruent.

These statements prove is congruent to .



* Segments and are the same length, so they are congruent. Therefore, there is a rigid motion that takes to . Apply that rigid motion to figure .
* If necessary, reflect the image of figure across to be sure the image of , which we will call , is on the same side of as .
* must be on ray since both and are on the same side of  and make the same angle with it at .
* Since points and are the same distance along the same ray from , they have to be in the same place.
* Therefore, figure is congruent to figure .



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