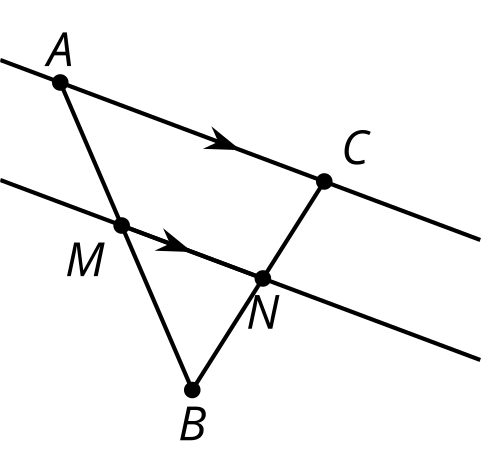
## Lesson 11: Splitting Triangle Sides with Dilation, Part 2

* Let’s investigate parallel segments in triangles.

### 11.1: Notice and Wonder: Parallel Segments

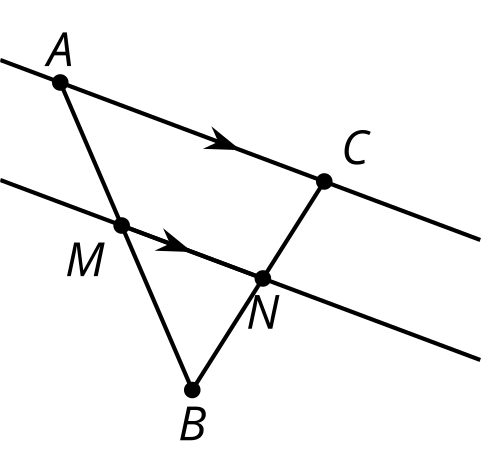
What do you notice? What do you wonder?



### 11.2: Prove It: Parallel Segments

Does a line parallel to one side of a triangle always create similar triangles?

1. Create several examples. Decide if the conjecture is true or false. If it’s false, make a more specific true conjecture.
2. Find any additional information you can be sure is true.  
   Label it on the diagram.

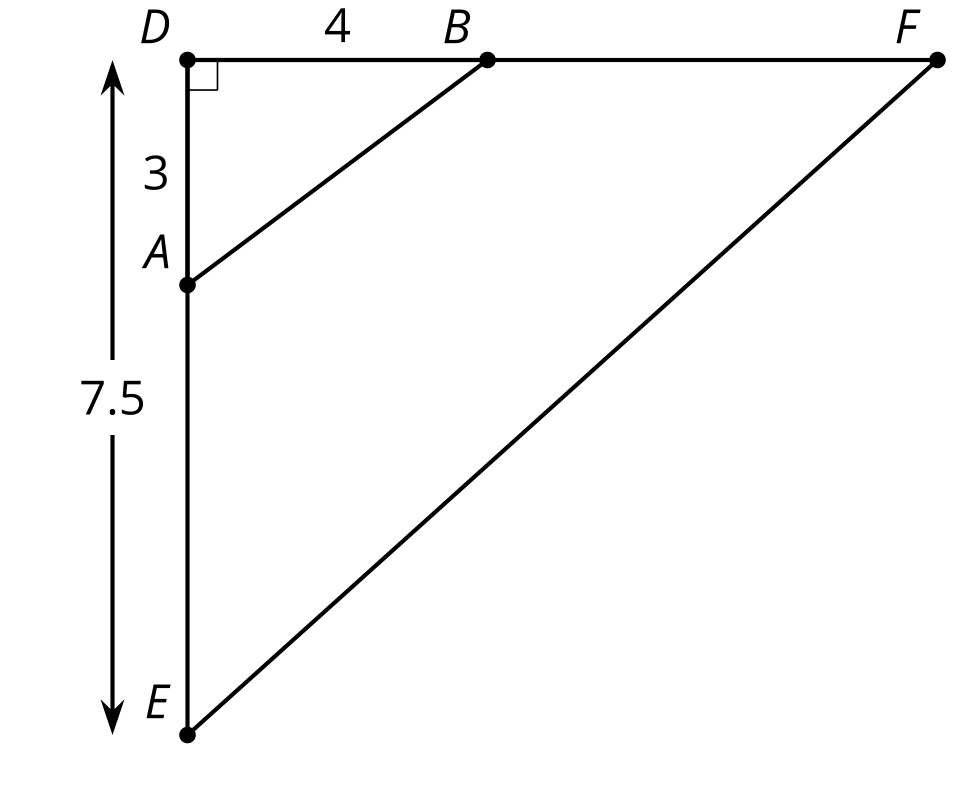
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1. Write an argument that would convince a skeptic that your conjecture is true.

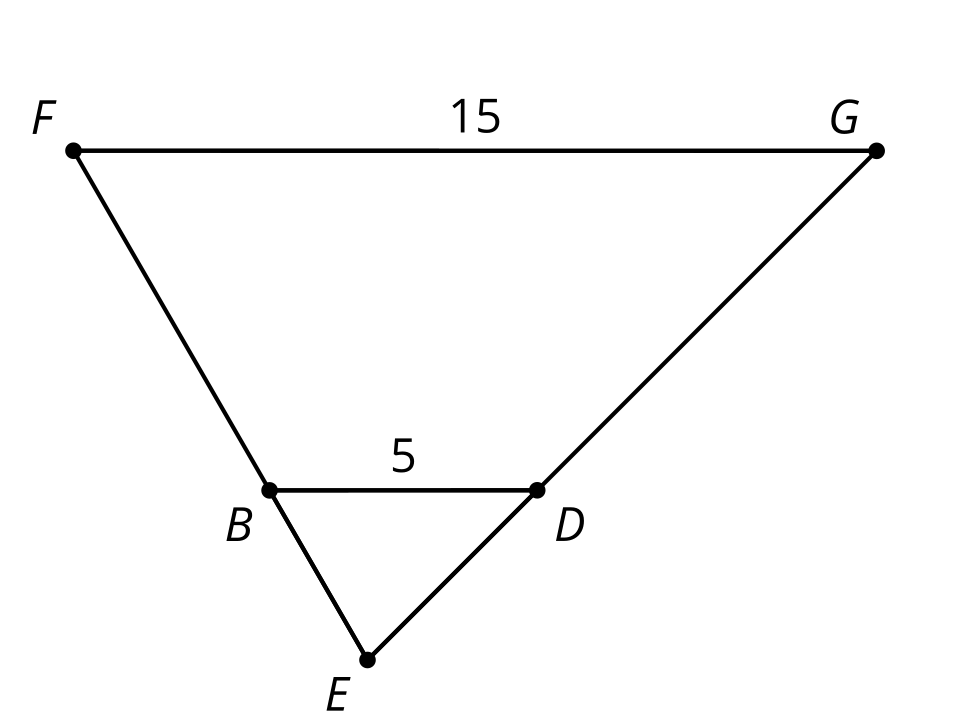
### 11.3: Preponderance of Proportional Relationships

Find the length of each unlabelled side.

1. Segments and are parallel.

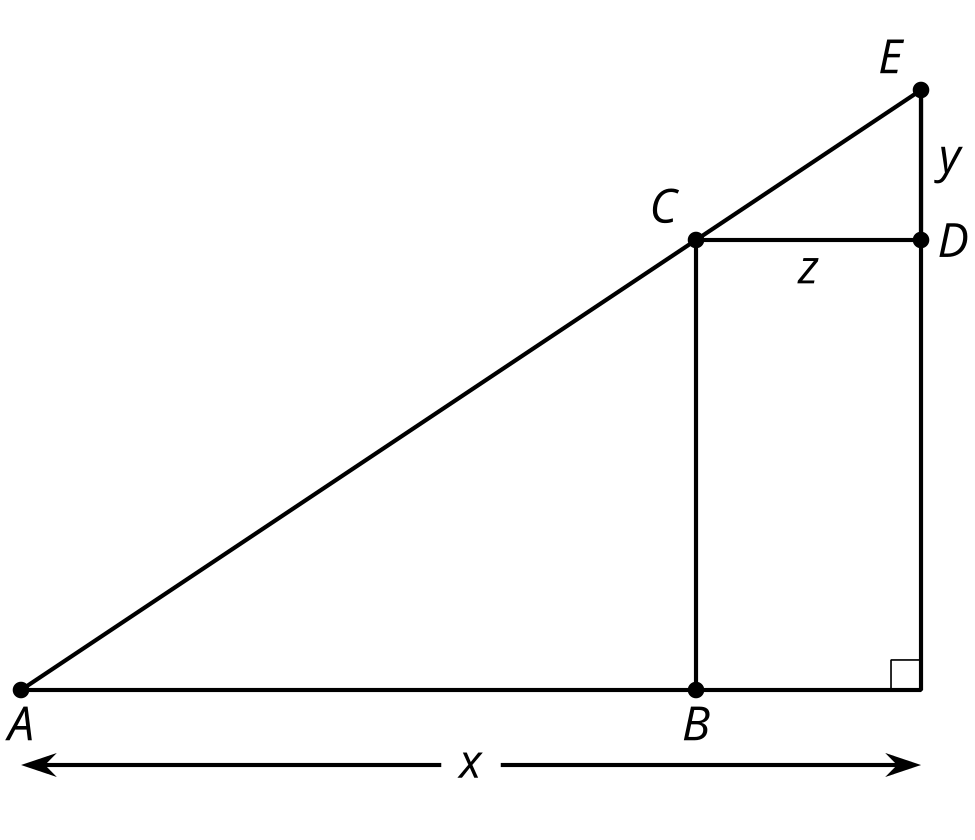
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1. Segments and are parallel. Segment is 12 units long. Segment is 2.5 units long.

* 

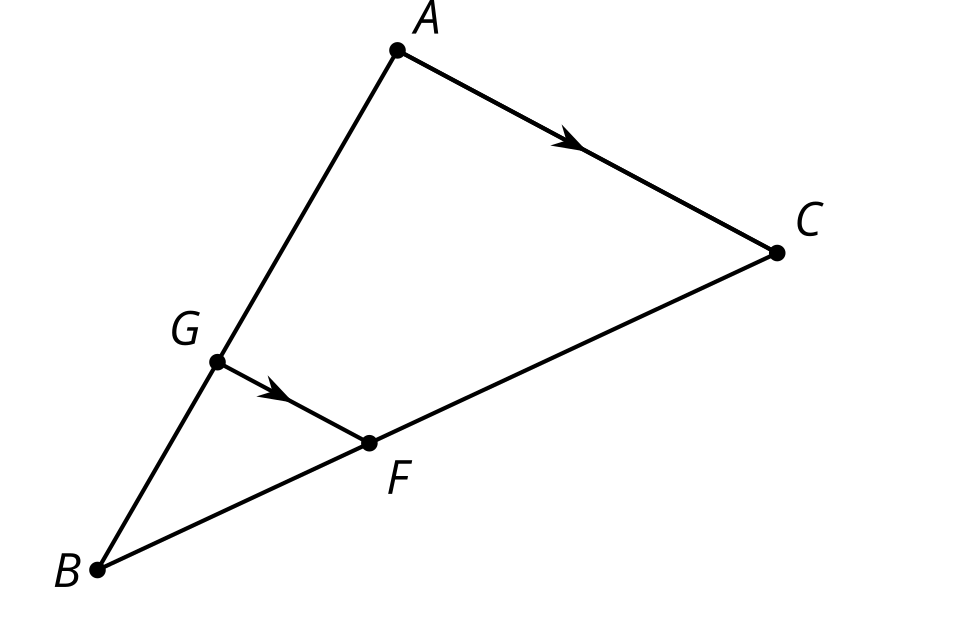
#### Are you ready for more?

Find the lengths of sides , and in terms of and . Explain or show your reasoning.



### Lesson 11 Summary

In triangle , segment is parallel to segment . We can show that corresponding angles in triangle and triangle are congruent, so the triangles are similar by the Angle-Angle Triangle Similarity Theorem. There must be a dilation that sends triangle to triangle , and so pairs of corresponding side lengths are in the same proportion. Then we can show that segment divides segments and proportionally. In other words, =.



For example, suppose is of the way from to and is of the way from to . Then if and , we know that and . What will and equal? Since and , we know that and can show that =.

This argument holds in general. A segment in a triangle that is parallel to one side of the triangle divides the other 2 sides of the triangle proportionally.



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