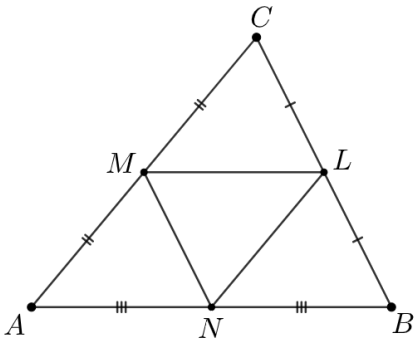
Name: _____

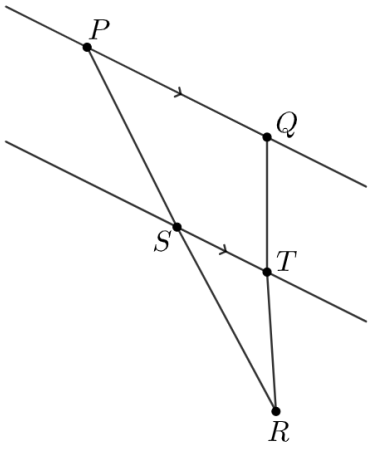
Lesson 3.08
Midsegments & Parallel Lines

Geometry GT

Analyze

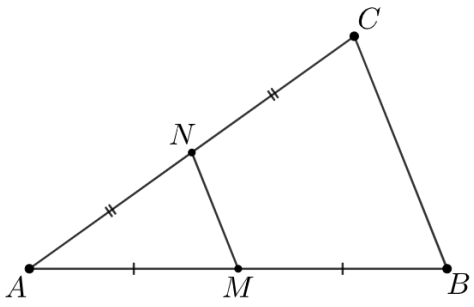
For each figure, answer the following questions: What do you notice? What do you wonder?





Explore

Here is triangle ΔABC with point M as the midpoint of $\overline{AB}$ and point N as the midpoint of $\overline{AC}$.



ΔABC is a dilation of ΔAMN. What is the center of the dilation? What is the scale factor?

Explain why $BC = 2MN$ must be true.

Explain why $\overline{MN}$ must be parallel to $\overline{BC}$.

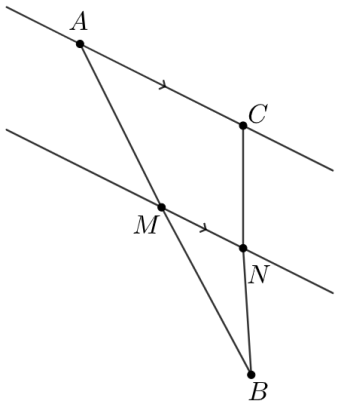
Theorem

If a line divides two sides of a triangle proportionally, then the line must be parallel to the third side of the triangle

Discuss

Does a line parallel to one side of a triangle always create similar triangles? Create several examples, and consider if there are any additional requirements to create similar triangles.

Using the diagram below, find any additional information you can be sure is true, and explain why similar triangles are always created by this parallel line.

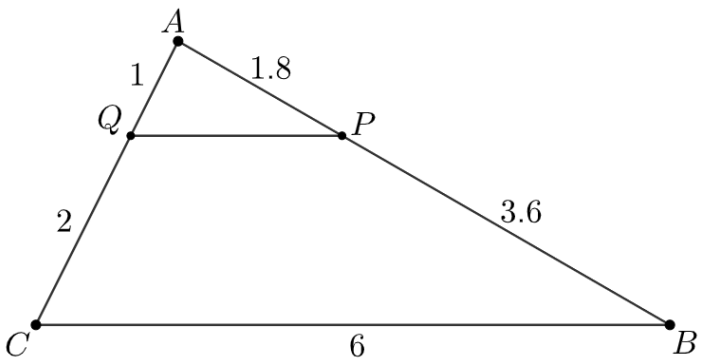


Theorem

If a line intersects two sides of a triangle and is parallel to the third side, then the line must create a triangle similar to the original triangle

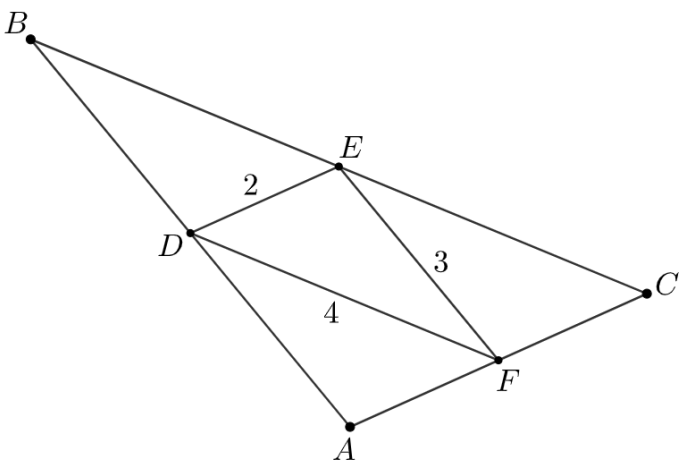
Demonstrate

What must be true about $\overline{PQ}$?



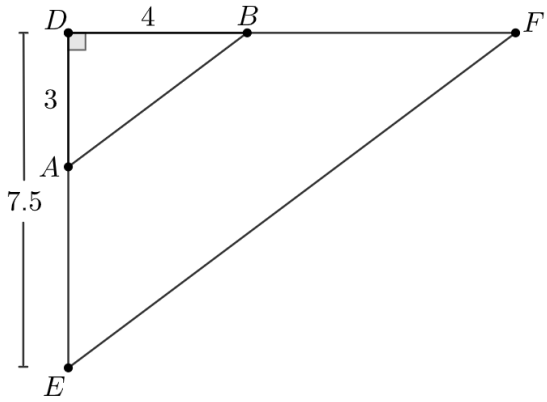
Practice

1. ΔDEF is formed by connecting the midpoints of the sides of ΔABC. The lengths of ΔDEF are shown. What is the length of $\overline{AB}$?

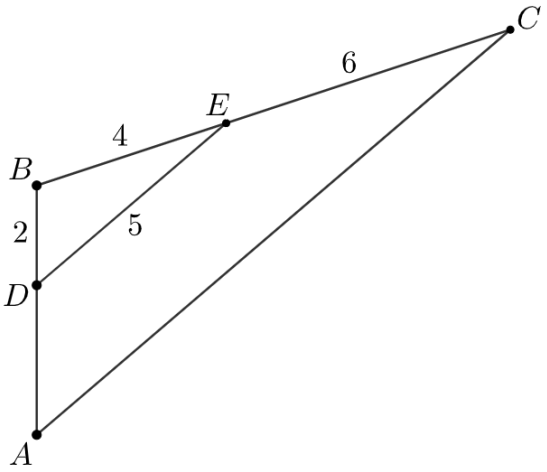


For problems #2-3, find the length of each unlabeled side.

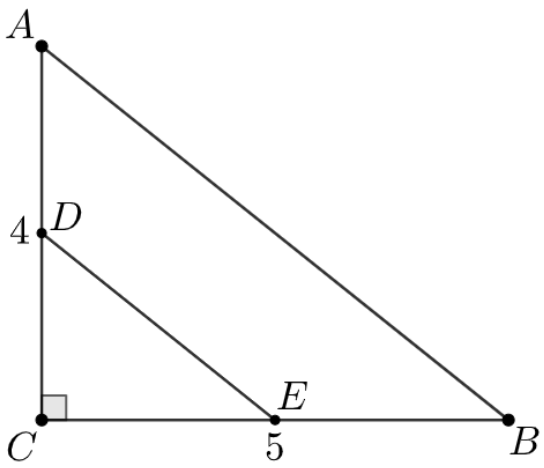
2. Segments $\overline{AB}$ and $\overline{EF}$ are parallel.



3. Segments $\overline{DE}$ and $\overline{AC}$ are parallel.



4. In right triangle ΔABC, $AC = 4$ and $BC = 5$. A new triangle ΔDEC is formed by connecting the midpoints of $\overline{AC}$ and $\overline{BC}$.



A. What is the area of ΔABC?

B. What is the area of ΔDEC?

C. Does the scale factor for the side lengths apply to the area as well? Explain.