

Geometry: 6.4-6.5 Notes

NAME _____

6.4 Use triangle midsegment theorem

Date: _____

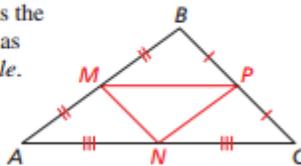
Define Vocabulary:

midsegment of a triangle –

Using the Midsegment of a Triangle

A **midsegment of a triangle** is a segment that connects the midpoints of two sides of the triangle. Every triangle has three midsegments, which form the *midsegment triangle*.

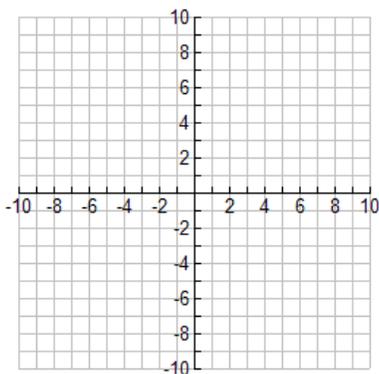
The midsegments of $\triangle ABC$ at the right are \overline{MP} , \overline{MN} , and \overline{NP} . The *midsegment triangle* is $\triangle MNP$.



Examples: Given the vertices of the triangle. What are the vertices of the midsegment triangle?

WE DO

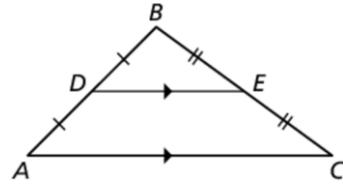
$A(-5, 6)$, $B(3, 8)$, and $C(1, -4)$.



Theorem 6.8 Triangle Midsegment Theorem

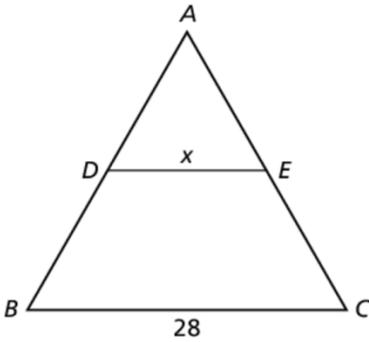
The segment connecting the midpoints of two sides of a triangle is parallel to the third side and is half as long as that side.

\overline{DE} is a midsegment of $\triangle ABC$, $\overline{DE} \parallel \overline{AC}$, and $DE = \frac{1}{2}AC$.

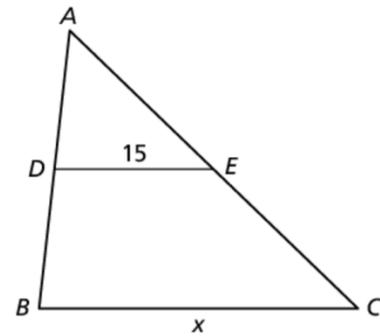
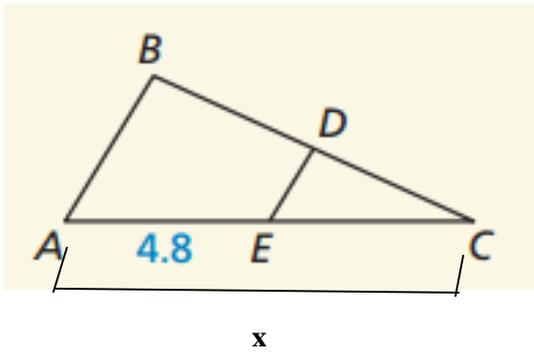
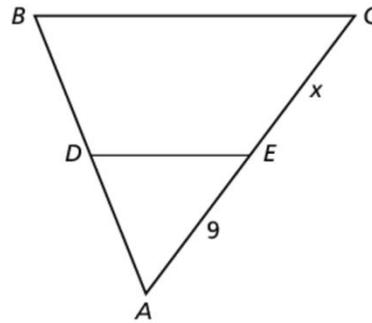


Examples: DE is a midsegment of $\triangle ABC$. Find the value of x .

WE DO

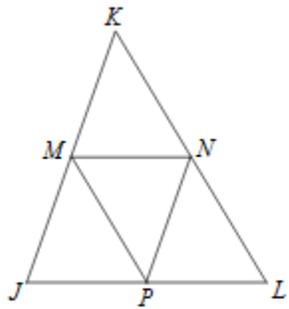


YOU DO

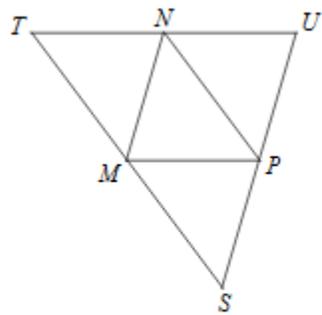


Examples: In each triangle M, N, and P are midpoints of the sides. Name a segment parallel to the one given.

WE DO

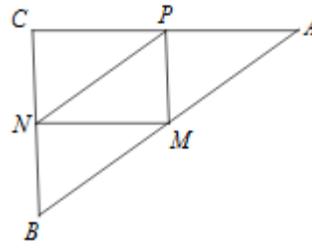


___ \parallel \overline{JK}

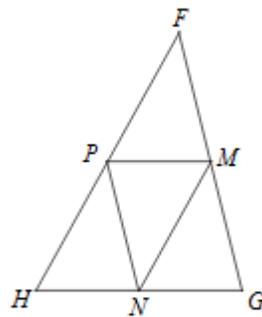


$\overline{MN} \parallel$ ___

YOU DO

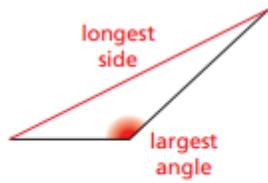


___ \parallel \overline{AC}

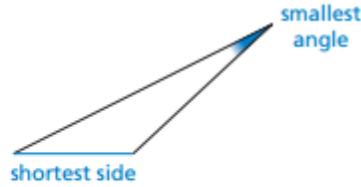


$\overline{MP} \parallel$ ___

Assignment	
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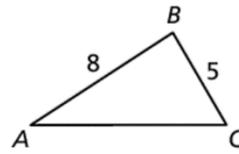
The longest side and largest angle are opposite each other.



The shortest side and smallest angle are opposite each other.

Theorem 6.9 Triangle Longer Side Theorem

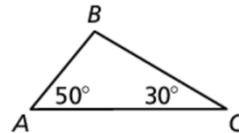
If one side of a triangle is longer than another side, then the angle opposite the longer side is larger than the angle opposite the shorter side.



$AB > BC$, so $m\angle C > m\angle A$.

Theorem 6.10 Triangle Larger Angle Theorem

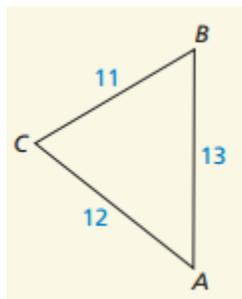
If one angle of a triangle is larger than another angle, then the side opposite the larger angle is longer than the side opposite the smaller angle.



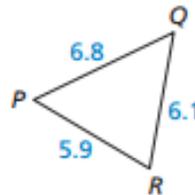
$m\angle A > m\angle C$, so $BC > AB$.

Examples: List the angles of the triangle in order from smallest to largest.

WE DO

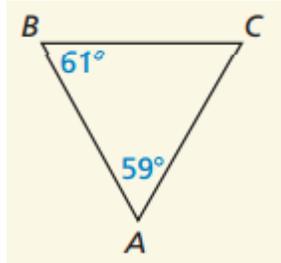


YOU DO

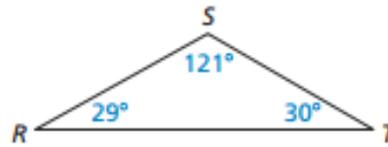


Examples: List the sides of the triangle in order from shortest to longest.

WE DO



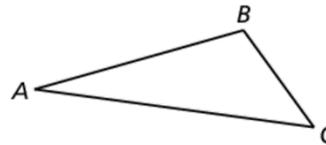
YOU DO



Theorem 6.11 Triangle Inequality Theorem

The sum of the lengths of any two sides of a triangle is greater than the length of the third side.

$$AB + BC > AC \quad AC + BC > AB \quad AB + AC > BC$$



Examples: Finding possible side lengths.

WE DO

A triangle has one side of length 6 and another side of length 15. Describe the possible lengths for the third side.

YOU DO

A triangle has one side of length 12 inches and another side of length 20 inches. Describe the possible lengths for the third side.

Examples: Decide whether it is possible to construct a triangle with the given side lengths. Explain your reasoning.

WE DO

4 ft, 9 ft, 10 ft

YOU DO

8 m, 9 m, 18m

5 cm, 7 cm, 12 cm

Assignment	
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