LESSON 8.5

NAME _____ DATE _____

Practice with Examples

For use with pages 488–496

GOAL **Use similarity theorems to prove that two triangles are similar**

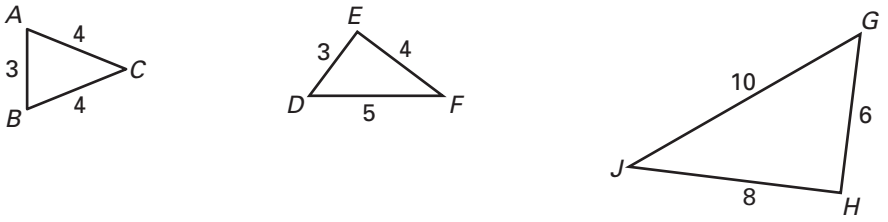
VOCABULARY

Theorem 8.2 Side-Side-Side (SSS) Similarity Theorem
If the corresponding sides of two triangles are proportional, then the triangles are similar.

Theorem 8.3 Side-Angle-Side (SAS) Similarity Theorem
If an angle of one triangle is congruent to an angle of a second triangle and the lengths of the sides including these angles are proportional, then the triangles are similar.

EXAMPLE 1 Using the SSS Similarity Theorem

Which of the following triangles are similar?



SOLUTION

To decide which, if any, of the triangles are similar, you need to consider the ratios of the lengths of corresponding sides.

Ratios of Side Lengths of $\triangle ABC$ and $\triangle DEF$

$\frac{BC}{DE} = \frac{1}{3}$	$\frac{CA}{DF} = \frac{3}{5}$	$\frac{AB}{EF} = \frac{2}{4} = \frac{1}{2}$
Shortest sides	Longest sides	Remaining sides

Because the ratios are not equal, $\triangle ABC$ and $\triangle DEF$ are not similar.

Ratios of Side Lengths of $\triangle GHJ$ and $\triangle DEF$

$\frac{GH}{DE} = \frac{6}{3} = \frac{2}{1}$	$\frac{GJ}{DF} = \frac{10}{5} = \frac{2}{1}$	$\frac{HJ}{EF} = \frac{8}{4} = \frac{2}{1}$
Shortest sides	Longest sides	Remaining sides

Because the ratios are equal, $\triangle GHJ \sim \triangle DEF$.

Since $\triangle DEF$ is similar to $\triangle GHJ$ and $\triangle DEF$ is not similar to $\triangle ABC$, $\triangle GHJ$ is not similar to $\triangle ABC$.

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Reteaching with Practice

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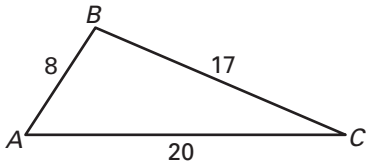
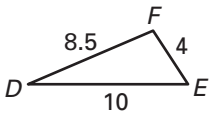
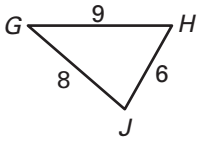
Exercises for Example 1

Determine which two of the three given triangles are similar.

1.







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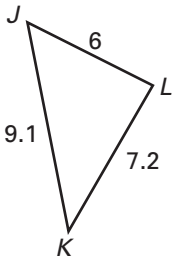

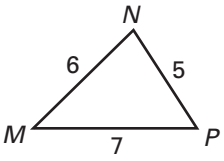

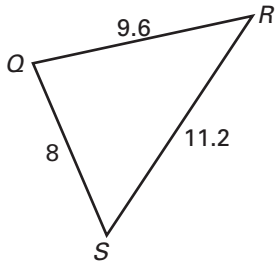

LESSON 8.5 CONTINUED

NAME _____ DATE _____

Practice with Examples

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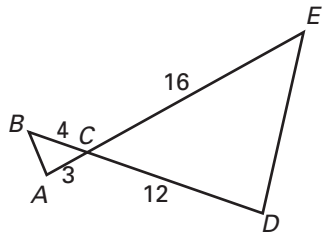
EXAMPLE 2 Using the SAS Similarity Theorem

Use the given lengths to prove that $\triangle ABC \sim \triangle DEC$.



SOLUTION

Begin by finding the ratios of the lengths of the corresponding sides.

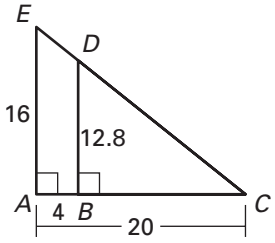
$$\frac{AC}{DC} = \frac{3}{12} = \frac{1}{4} \qquad \frac{BC}{EC} = \frac{4}{16} = \frac{1}{4}$$

So, the side lengths $\overline{AC}$ and $\overline{BC}$ of $\triangle ABC$ are proportional to the corresponding side lengths $\overline{DC}$ and $\overline{EC}$ of $\triangle DEC$. The included angle in $\triangle ABC$ is $\angle BCA$; the included angle in $\triangle DEC$ is $\angle ECD$. Because these two angles are vertical angles, they are congruent. So, by the SAS Similarity Theorem, $\triangle ABC \sim \triangle DEC$.

Exercises for Example 2

Prove that the two triangles are similar.

3.



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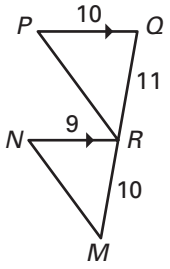

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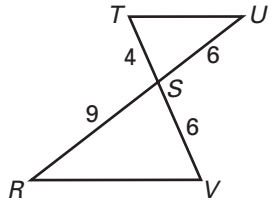

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