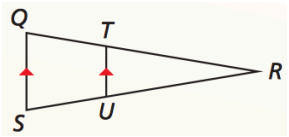
Proportionality Theorems
Notes 8.4

Using the Triangle Proportionality Theorem

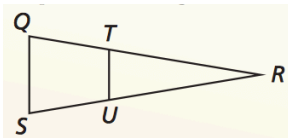
Triangle Proportionality Theorem—If a _____ parallel to _____ side of a _____ intersects the other _____ sides, the it _____ the _____ sides _____.

If _____, then _____.



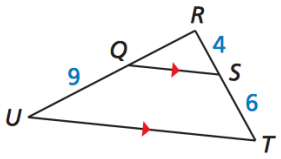
Converse of the Triangle Proportionality Theorem—If a _____ divides _____ _____of a triangle _____, then it is _____ to the _____ side.

If _____, then _____.



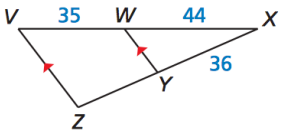
Example 1: *Finding the Length of a Segment*

In the diagram, $\overline{QS} \parallel \overline{UT}$, $RS = 4, ST = 6,$ and $QU = 9$. What is the length of $\overline{RQ}$?



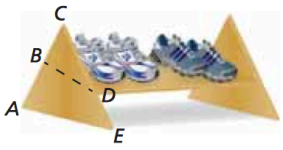
You Try!

1. Find the length of $\overline{YZ}$.



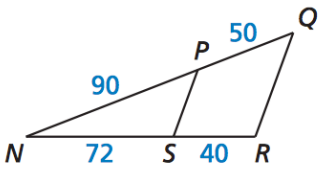
Example 2: *Solving a Real-Life Problem*

On the shoe rack shown, $BA = 33$ centimeters, $CB = 27$ centimeters, $CD = 44$ centimeters, and $DE = 25$ centimeters. Explain why the shelf is not parallel to the floor.



You Try!

2. Determine whether $\overline{PS} \parallel \overline{QR}$.



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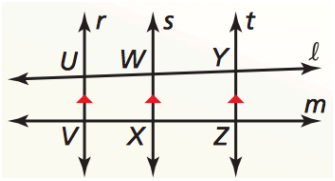
Using Other Proportionality Theorems

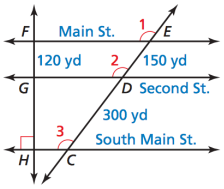
Three Parallel Lines Theorem—If _____ parallel lines _____ two _____, then they _____ the _____ _____.

_____ = _____



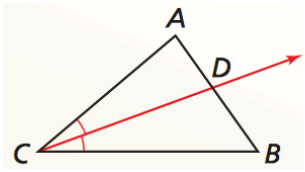
Example 3: *Using the Three Parallel Lines Theorem*

In the diagram, $\angle 1, \angle 2,$ and, $\angle 3$ are all congruent, $GF = 120$ yards, $DE = 150$ yards, and $CD = 300$ yards. Find the distance HF between Main Street and South Main St.



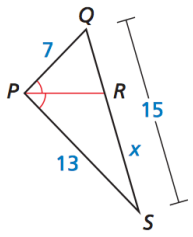
Triangle Angle Bisector Theorem—If a _____ bisects an _____ of a _____, then it _____ the _____ sides into _____ whose lengths are _____ to the _____ of the other _____ _____.

_____ = _____



Example 4: *Using the Triangle Angle Bisector Theorem*

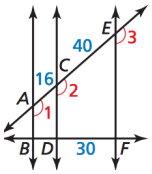
In the diagram, $\angle QPR \cong \angle RPS$. Use the given side lengths to find the length of $\overline{RS}$.



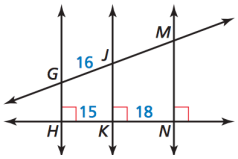
You Try!

Find the length of the given line segment.

3. $\overline{BD}$

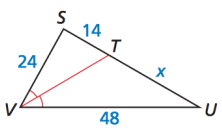


4. $\overline{JM}$



Find the value of the variable.

5.



6.