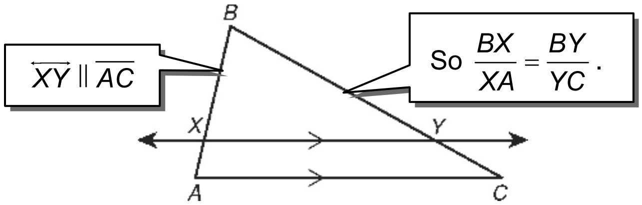
Name ______________________ Date ______________ Class ______________

LESSON 8-4

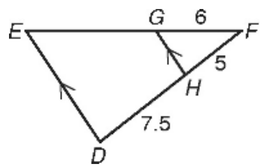
Reteach

Applying Properties of Similar Triangles

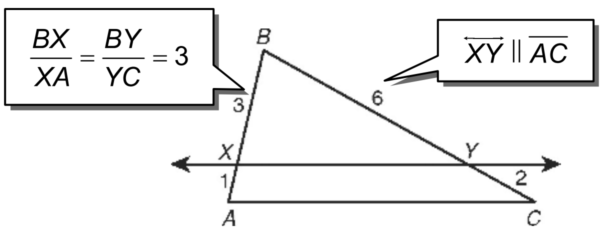
<table>
<tr><th>Triangle Proportionality Theorem</th><th>Example</th></tr>
<tr><td>If a line parallel to a side of a triangle intersects the other two sides, then it divides those sides proportionally.</td><td>
</td></tr>
</table>

You can use the Triangle Proportionality Theorem to find lengths of segments in triangles.

Find *EG*.

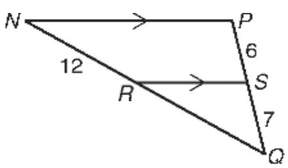


$\frac{EG}{GF} = \frac{DH}{HF}$	Triangle Proportionality Theorem
$\frac{EG}{6} = \frac{7.5}{5}$	Substitute the known values.
$EG(5) = 6(7.5)$	Cross Products Property
$5(EG) = 45$	Simplify.
$EG = 9$	Divide both sides by 5.

<table>
<tr><th>Converse of the Triangle Proportionality Theorem</th><th>Example</th></tr>
<tr><td>If a line divides two sides of a triangle proportionally, then it is parallel to the third side.</td><td>
</td></tr>
</table>

Find the length of each segment in Exercises 1 and 2.

1. $\overline{RQ}$



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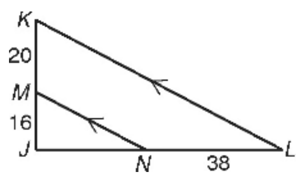
2. $\overline{JN}$



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3. Show that $\overline{TU}$ and $\overline{WX}$ are parallel.

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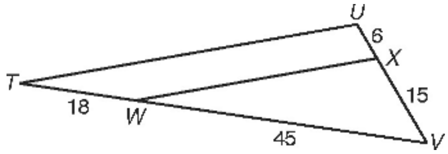
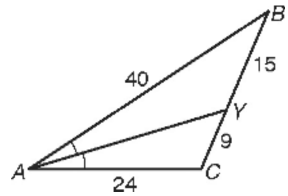


Name ______________________ Date ______________ Class ______________

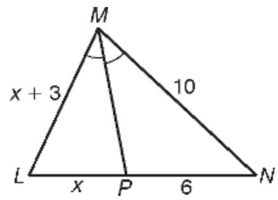
LESSON 8-4

Reteach

Applying Properties of Similar Triangles continued

Triangle Angle Bisector Theorem	Example
An angle bisector of a triangle divides the opposite side into two segments whose lengths are proportional to the lengths of the other two sides. ($\triangle$ $\angle$ Bisector Thm.)	 $\frac{BY}{YC} = \frac{15}{9} = \frac{5}{3}$ $\frac{AB}{AC} = \frac{40}{24} = \frac{5}{3}$

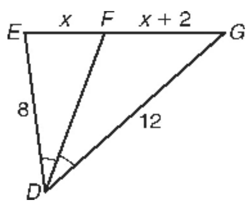
Find *LP* and *LM*.



$\frac{LP}{PN} = \frac{ML}{NM}$	$\triangle$ $\angle$ Bisector Thm.
$\frac{x}{6} = \frac{x+3}{10}$	Substitute the given values.
$x(10) = 6(x+3)$	Cross Products Property
$10x = 6x + 18$	Distributive Property
$4x = 18$	Simplify.
$x = 4.5$	Divide both sides by 4.
$LP = x = 4.5$	
$LM = x + 3 = 4.5 + 3 = 7.5$	

Find the length of each segment.

4. $\overline{EF}$ and $\overline{FG}$



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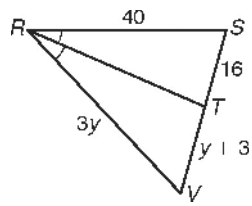
5. $\overline{RV}$ and $\overline{TV}$



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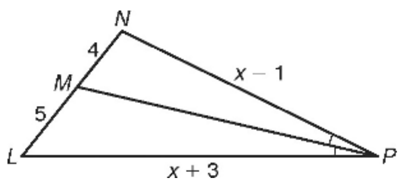
6. $\overline{NP}$ and $\overline{LP}$



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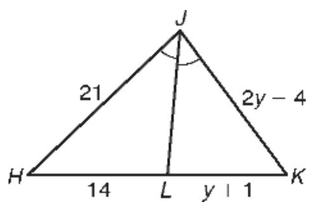
7. $\overline{JK}$ and $\overline{LK}$



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8-4 APPLYING PROPERTIES OF SIMILAR TRIANGLES

Practice A

1. proportionally
2. transversals
3. angle bisector
4. third side
5. 12
6. 4
7. $\frac{18}{15}$; $\frac{6}{5}$; $\frac{24}{20}$; $\frac{6}{5}$
8. yes
9. 25.6 yards
10. 8
11. 8

Practice B

1. 5.4
2. 20
3. $PN = 66$ and $QM = 88$. $\frac{LP}{PN} = \frac{9}{66} = \frac{3}{22}$ and $\frac{LQ}{QM} = \frac{12}{88} = \frac{3}{22}$. Because $\frac{LP}{PN} = \frac{LQ}{QM}$, $\overline{PQ} \parallel \overline{NM}$ by the Conv. of the △ Proportionality Thm.
4. $\frac{FW}{WD} = \frac{1.5}{2.5} = \frac{3}{5}$ and $\frac{FX}{XE} = \frac{2.1}{3.5} = \frac{3}{5}$. Because $\frac{FW}{WD} = \frac{FX}{XE}$, $\overline{WX} \parallel \overline{DE}$ by the Conv. of the △ Proportionality Thm.
5. $SR = 56$; $RQ = 42$
6. $BE = 1.25$; $DE = 1$
7. isosceles

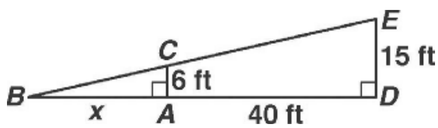
Practice C

1. Possible answer: It is given that $\overline{EF} \parallel \overline{BC}$. $\angle B$ corresponds to $\angle AEF$ and $\angle C$ corresponds to $\angle AFE$ on the transversals, so $\angle B \cong \angle AEF$ and $\angle C \cong \angle AFE$. Thus, $\triangle ABC \sim \triangle AEF$ by the AA Similarity Postulate. By the definition of similar polygons, $\frac{AB}{AE} = \frac{AC}{AF}$. But by the Segment Addition Postulate, $AB = AE + EB$ and $AC = AF + FC$. Substitution leads to $\frac{AE + EB}{AE} = \frac{AF + FC}{AF}$. This can be simplified to $1 + \frac{EB}{AE} = 1 + \frac{FC}{AF}$. The Subtraction Property of Equality shows that $\frac{EB}{AE} = \frac{FC}{AF}$, which can be rewritten as $\frac{AE}{EB} = \frac{AF}{FC}$.
2. $AX = 20$ miles; $AY = 15$ miles
3. $KN = 3.6$; $LM = 16.5$
4. $0 < \frac{ZP}{PY}$
5. $0 < \frac{ZP}{ZX} < 1$

Reteach

1. 14
2. 30.4
3. $\frac{TW}{WV} = \frac{UX}{XV} = \frac{2}{5}$, so $\overline{TU} \parallel \overline{WX}$ by the Conv. of the △ Proportionality Thm.
4. $EF = 4$; $FG = 6$
5. $RV = 45$; $TV = 18$
6. $NP = 16$; $LP = 20$
7. $JK = 18$; $LK = 12$

Challenge

1. 

overlapping right triangles
2. similar triangles
3. 1. $\triangle ABC$ and $\triangle DBE$ are overlapping right triangles; Given. 2. $\angle B \sim \angle B$; Reflexive Property of Congruence. 3. $\angle CAB \cong \angle EDB$; All right angles are congruent (Right Angle Congruence Theorem). 4. $\triangle ABC \sim \triangle DBE$; AA Similarity (Angle-Angle Similarity Postulate).
4. $\frac{15}{x + 40} = \frac{6}{x}$
5. 26.7 ft
6. 4 cm
7. $4\sqrt{3}$ cm
8. 16 cm
9. $8\sqrt{3}$ cm