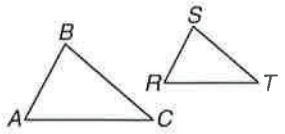
NAME _____ DATE _____ PERIOD ____

7-5 Study Guide and Intervention

Parts of Similar Triangles

Perimeters If two triangles are similar, their perimeters have the same proportion as the corresponding sides.



If $\triangle ABC \sim \triangle RST$, then

$$\frac{AB + BC + AC}{RS + ST + RT} = \frac{AB}{RS} = \frac{BC}{ST} = \frac{AC}{RT}.$$

Example **Use the diagram above with $\triangle ABC \sim \triangle RST$. If $AB = 24$ and $RS = 15$, find the ratio of their perimeters.**

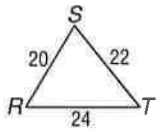
Since $\triangle ABC \sim \triangle RST$, the ratio of the perimeters of $\triangle ABC$ and $\triangle RST$ is the same as the ratio of corresponding sides.

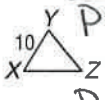
$$\text{Therefore } \frac{\text{perimeter of } \triangle ABC}{\text{perimeter of } \triangle RST} = \frac{24}{15} = \frac{8}{5}$$

Exercises

Each pair of triangles is similar. Find the perimeter of the indicated triangle.

1. $\triangle XYZ$



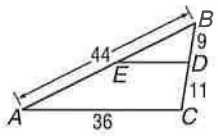


$\frac{P_{XYZ}}{P_{RST}} = \frac{10}{20}$

$\frac{P_{XYZ}}{20+22+24} = \frac{1}{2}$

$P_{XYZ} = 33$

2. $\triangle BDE$

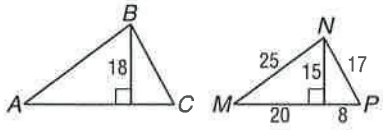


$\frac{P_{BDE}}{P_{BCA}} = \frac{BD}{DC}$

$\frac{P_{BDE}}{44+36+20} = \frac{9}{11}$

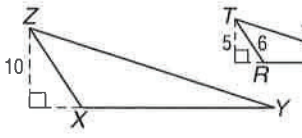
$P_{BDE} = 81\frac{9}{11}$

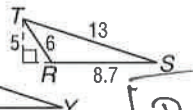
3. $\triangle ABC$



$P_{ABC} = 84$

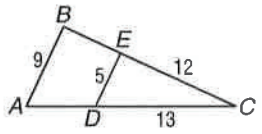
4. $\triangle XYZ$





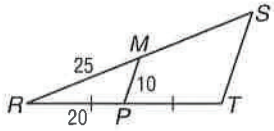
$P_{XYZ} = 55.4$

5. $\triangle ABC$



$P_{ABC} = 54$

6. $\triangle RST$



$P_{RST} = 110$

Lesson 7-5

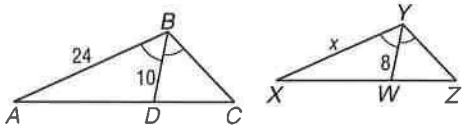
NAME _____ DATE _____ PERIOD ____

7-5 Study Guide and Intervention *(continued)*

Parts of Similar Triangles

Special Segments of Similar Triangles When two triangles are similar, corresponding altitudes, angle bisectors, and medians are proportional to the corresponding sides. Also, in any triangle an angle bisector separates the opposite side into segments that have the same ratio as the other two sides of the triangle.

Example 1 **In the figure, $\triangle ABC \sim \triangle XYZ$, with angle bisectors as shown. Find x.**



Since $\triangle ABC \sim \triangle XYZ$, the measures of the angle bisectors are proportional to the measures of a pair of corresponding sides.

$\frac{AB}{XY} = \frac{BD}{YW}$

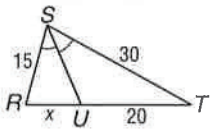
$\frac{24}{x} = \frac{10}{8}$

$10x = 24(8)$

$10x = 192$

$x = 19.2$

Example 2 **$\overline{SU}$ bisects $\angle RST$. Find x.**



Since $\overline{SU}$ is an angle bisector, $\frac{RU}{TU} = \frac{RS}{TS}$.

$\frac{x}{20} = \frac{15}{30}$

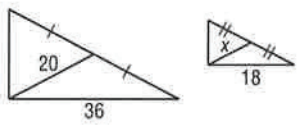
$30x = 20(15)$

$30x = 300$

$x = 10$

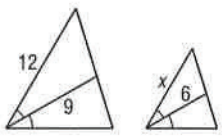
Exercises

Find x for each pair of similar triangles.

1. 

$\frac{20}{x} = \frac{36}{18}$

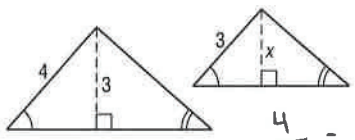
$x = 10$

2. 

$\frac{12}{x} = \frac{9}{6}$

$6(12) = 9x$

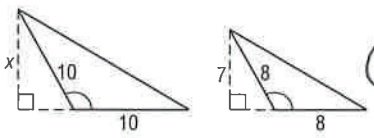
$8 = x$

3. 

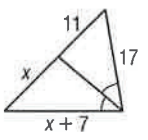
$\frac{4}{3} = \frac{3}{x}$

$4x = 9$

$x = 2\frac{1}{4}$

4. 

$x = 8\frac{3}{4}$

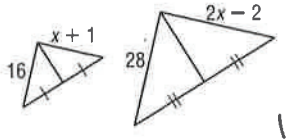
5. 

$\frac{x+7}{17} = \frac{x}{11}$

$11(x+7) = 17x$

$11x + 77 = 17x$

$x = 12\frac{5}{6}$

6. 

$\frac{2x-2}{x+1} = \frac{28}{16}$

$16(2x-2) = 28(x+1)$

$32x - 32 = 28x + 28$

$4x = 60$

$x = 15$