

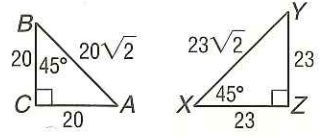
6-2 Study Guide and Intervention

Similar Polygons

Identify Similar Figures

Example 1 Determine whether the triangles are similar.

Two polygons are similar if and only if their corresponding angles are congruent and their corresponding sides are proportional.



$\angle C \cong \angle Z$ because they are right angles, and $\angle B \cong \angle X$.
By the Third Angle Theorem, $\angle A \cong \angle Y$.

For the sides, $\frac{BC}{XZ} = \frac{20}{23}$, $\frac{BA}{XY} = \frac{20\sqrt{2}}{23\sqrt{2}} = \frac{20}{23}$, and $\frac{AC}{YZ} = \frac{20}{23}$.

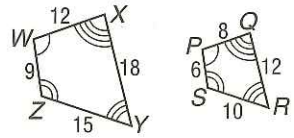
The side lengths are proportional. So $\triangle BCA \sim \triangle XZY$.

Example 2 Is polygon WXYZ ~ polygon PQRS?

For the sides, $\frac{WX}{PQ} = \frac{12}{8} = \frac{3}{2}$, $\frac{XY}{QR} = \frac{18}{12} = \frac{3}{2}$, $\frac{YZ}{RS} = \frac{15}{10} = \frac{3}{2}$,

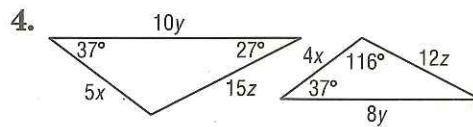
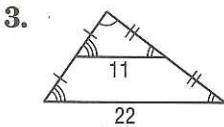
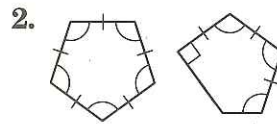
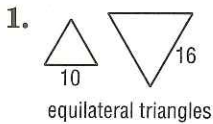
and $\frac{ZW}{SP} = \frac{9}{6} = \frac{3}{2}$. So corresponding sides are proportional.

Also, $\angle W \cong \angle P$, $\angle X \cong \angle Q$, $\angle Y \cong \angle R$, and $\angle Z \cong \angle S$, so corresponding angles are congruent. We can conclude that polygon WXYZ ~ polygon PQRS.



Exercises

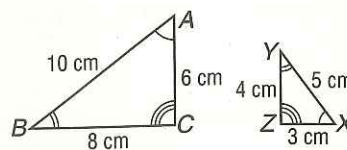
Determine whether each pair of figures is similar. If they are similar, give the ratio of corresponding sides.



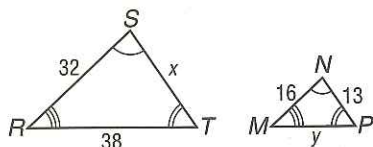
6-2 Study Guide and Intervention (continued)

Similar Polygons

Scale Factors When two polygons are similar, the ratio of the lengths of corresponding sides is called the **scale factor**. At the right, $\triangle ABC \sim \triangle XYZ$. The scale factor of $\triangle ABC$ to $\triangle XYZ$ is 2 and the scale factor of $\triangle XYZ$ to $\triangle ABC$ is $\frac{1}{2}$.



Example 1 The two polygons are similar. Find x and y .



Use the congruent angles to write the corresponding vertices in order.

$$\triangle RST \sim \triangle MNP$$

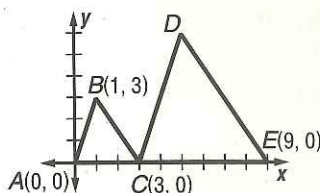
Write proportions to find x and y .

$$\frac{32}{16} = \frac{x}{13} \qquad \frac{38}{y} = \frac{32}{16}$$

$$16x = 32(13) \qquad 32y = 38(16)$$

$$x = 26 \qquad y = 19$$

Example 2 $\triangle ABC \sim \triangle CDE$. Find the scale factor and find the lengths of \overline{CD} and \overline{DE} .



$AC = 3 - 0 = 3$ and $CE = 9 - 3 = 6$. The scale factor of $\triangle CDE$ to $\triangle ABC$ is 6:3 or 2:1.

Using the Distance Formula,

$$AB = \sqrt{1 + 9} = \sqrt{10} \text{ and}$$

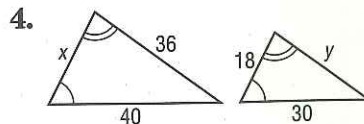
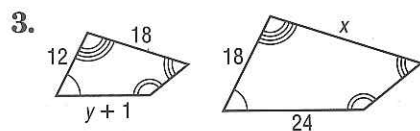
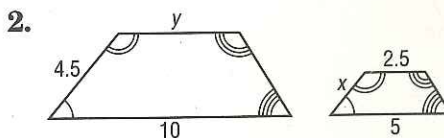
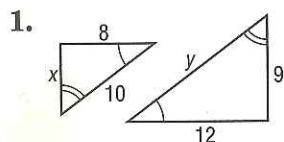
$BC = \sqrt{4 + 9} = \sqrt{13}$. The lengths of the sides of $\triangle CDE$ are twice those of $\triangle ABC$,

$$\text{so } DC = 2(BA) \text{ or } 2\sqrt{10} \text{ and}$$

$$DE = 2(BC) \text{ or } 2\sqrt{13}.$$

Exercises

Each pair of polygons is similar. Find x and y .



5. In Example 2 above, point D has coordinates $(5, 6)$. Use the Distance Formula to verify the lengths of \overline{CD} and \overline{DE} .

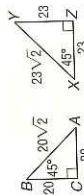
NAME _____ DATE _____ PERIOD _____

6-2 Study Guide and Intervention

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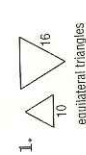
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Example 3

Determine whether each pair of figures is similar. If they are similar, give the ratio of corresponding sides.



yes; $\frac{5}{8}$



yes; $\frac{1}{2}$



no



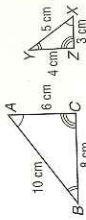
yes; $\frac{5}{4}$

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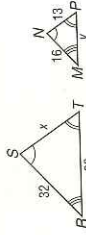
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Use the congruent angles to write the corresponding vertices in order.

$\triangle RST \sim \triangle MNP$

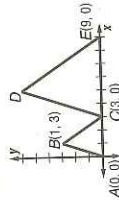
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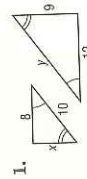
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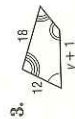
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Example 3

Each pair of polygons is similar. Find x and y .



$x = 6; y = 15$



$x = 27; y = 15$



$x = 2.25; y = 5$



$x = 24; y = 27$

5. In Example 2 above, point D has coordinates (5, 6). Use the Distance Formula to verify the lengths of \overline{CD} and \overline{DE} .

$CD = 2\sqrt{10}, DE = 2\sqrt{13}$

$\sqrt{40} \quad \sqrt{52}$