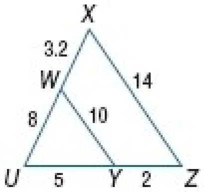
7-3 Similar Triangles

Determine whether the triangles are similar. If so, write a similarity statement. If not, what would be sufficient to prove the triangles similar? Explain your reasoning.

9. 

SOLUTION:

Matching up short to short, middle to middle, and long to long sides, we get the following ratios:

$\frac{UZ}{UY} = \frac{7}{5} = 1.4$

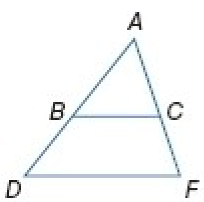
$\frac{UX}{UW} = \frac{11.2}{8} = 1.4$

$\frac{XZ}{WY} = \frac{14}{10} = 1.4$

Since, $\frac{UZ}{UY} = \frac{UX}{UW} = \frac{XZ}{WY} = 1.4$ then $\Delta XUZ \sim \Delta WUY$ by SSS Similarity.

ANSWER:

Yes; $\Delta XUZ \sim \Delta WUY$ by SSS Similarity.

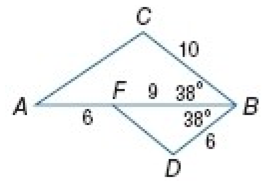
10. 

SOLUTION:

No; $\overline{BC}$ needs to be parallel to $\overline{DF}$ for $\Delta DAF \sim \Delta BAC$ by AA Similarity. Additionally, there are no given side lengths to compare to use SAS or SSS Similarity theorems.

ANSWER:

No; $\overline{BC}$ needs to be parallel to $\overline{DF}$ for $\Delta DAF \sim \Delta BAC$ by AA Similarity.

11. 

SOLUTION:

We know that $\angle ABC \cong \angle FBD$, because their measures are equal. We also can match up the adjacent sides that include this angle and determine if they have the same ratio. We will match short to short and middle to middle lengths.

$\frac{BD}{BC} = \frac{6}{10} = \frac{3}{5}$

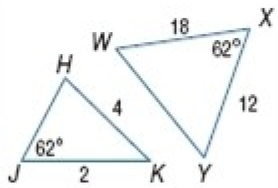
$\frac{BF}{BA} = \frac{9}{9+6} = \frac{9}{15} = \frac{3}{5}$

Yes; since $\frac{BD}{BC} = \frac{BF}{BA}$ and $\angle ABC \cong \angle FBD$, we know that $\Delta CBA \sim \Delta DBF$ by SAS Similarity.

ANSWER:

Yes; $\Delta CBA \sim \Delta DBF$ by SAS Similarity.

Determine whether the triangles are similar. If so, write a similarity statement. If not, what would be sufficient to prove the triangles similar? Explain your reasoning.

13. 

SOLUTION:

The known information for ΔWXY relates to a SAS relationship, whereas the known information for ΔHJK is a SSA relationship. Since they are no the same relationship, there is not enough information to determine if the triangles are similar.

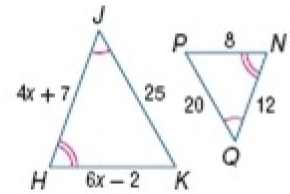
If *JH* = 3 or *WY* = 24, then all the sides would have the same ratio and we could prove $\Delta JHK \sim \Delta WXY$ by SSS Similarity.

ANSWER:

No; not enough information to determine. If *JH* = 3 or *WY* = 24, then $\Delta JHK \sim \Delta WXY$ by SSS Similarity.

ALGEBRA Identify the similar triangles. Then find each measure.

19. *HJ*, *HK*



SOLUTION:

Since we are given two pairs of congruent angles, we know that $\Delta HJK \sim \Delta NQP$, by AA Similarity.

Use the corresponding side lengths to write a proportion.

$$\frac{HJ}{NQ} = \frac{JK}{QP}$$
$$\frac{4x+7}{12} = \frac{25}{20}$$

Solve for *x*.

$$20(4x+7) = 12 \cdot 25$$
$$80x + 140 = 300$$
$$80x = 160$$
$$x = 2$$

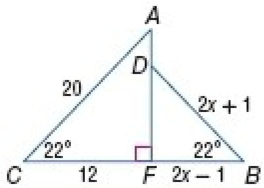
Substitute *x* = 2 in *HJ* and *HK*.

HJ = 4*(2)* + 7
=15
HK = 6*(2)* – 2
= 10

ANSWER:

$\Delta HJK \sim \Delta NQP$; 15, 10

20. *DB*, *CB*



SOLUTION:

We know that $\angle CFA \cong \angle DFB$ (All right angles are congruent.) and we are given that $m\angle C = m\angle B$.

Therefore, $\triangle DFB \sim \triangle AFC$, by AA Similarity.

Use the corresponding side lengths to write a proportion.

$$\frac{DB}{AC} = \frac{FB}{FC}$$

$$\frac{2x+1}{20} = \frac{2x-1}{12}$$

Solve for *x*.

$$12(2x+1) = 20(2x-1)$$
$$24x + 12 = 40x - 20$$
$$-16x = -32$$
$$x = 2$$

Substitute *x* = 2 in *DB* and *CB*.

DB = 2(2) + 1
= 5

CB = 2 (2) – 1 + 12
= 15

ANSWER:

$\Delta DFB \sim \Delta AFC$; 5, 15