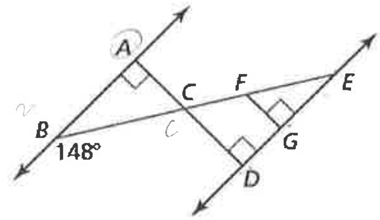
8.3 SSS and SAS Similarity

Bellwork - Use the diagram to copy and complete the statement.



1. $\triangle ABC \sim$ $\triangle DEC$ **2.** $\triangle FEG \sim$ CED

3. $m\angle ACB =$ $m\angle DCE$ **4.** $m\angle FEG =$ $m\angle CED$

5. $m\angle ACE =$ $m\angle DCB$ **6.** $AD \parallel$ FG

Write an equation of the line passing through point *P* that is perpendicular to the given line.

1. $P(0, -3)$, $y = -5x$

$\perp m = \frac{1}{5}$

$y = mx + b$

$-3 = \frac{1}{5}(0) + b$

$-3 = b$

$\boxed{y = \frac{1}{5}x - 3}$

2. $P(4, 0)$, $y = 9x + 8$

$-\frac{1}{9} = \perp m$

$0 = -\frac{1}{9}(4) + b$

$0 = -\frac{4}{9} + b$

$4/9 = b$

$\boxed{y = -\frac{1}{9}x + \frac{4}{9}}$

3. $P(-2, 4)$, $2x - 3y = -8$

$2x - 3y = -8$

$-3y = -2x - 8$

$y = \frac{2}{3}x + 8/3$

$\perp m = \frac{-3}{2}$

$4 = \frac{-3}{2}(-2) + b$

$4 = 3 + b$

$1 = b$

$\boxed{y = \frac{-3}{2}x + 1}$

4. $P\left(-\frac{2}{3}, 1\right)$, $y - 8 = -\frac{5}{2}(x + 3)$

$\perp m = \frac{2}{5}$

$y - 8 = -\frac{5}{2}x - 7.5$

$+8 \qquad +8$

$y = -\frac{5}{2}x + 0.5$

$1 = \frac{2}{5}\left(-\frac{2}{3}\right) + b$

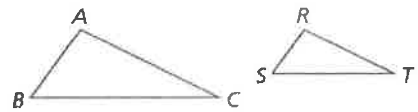
$1 = \frac{-4}{15} + b$

$1\frac{4}{15} = b$

$\boxed{y = \frac{2}{5}x + 1\frac{4}{15}}$

Theorem 8.4 Side-Side-Side (SSS) Similarity Theorem

If the corresponding side lengths of two triangles are proportional, then the triangles are similar.

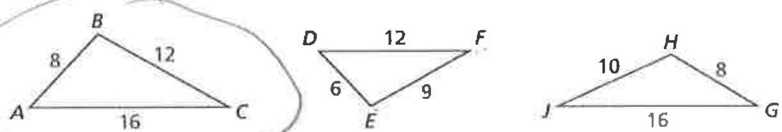


If $\frac{AB}{RS} = \frac{BC}{ST} = \frac{CA}{TR}$, then $\triangle ABC \sim \triangle RST$.

Proof p. 437

Is either $\triangle DEF$ or $\triangle GHJ$ similar to $\triangle ABC$?

$\triangle ABC \sim \triangle DEF$



$\triangle ABC$ is not similar to $\triangle GHJ$

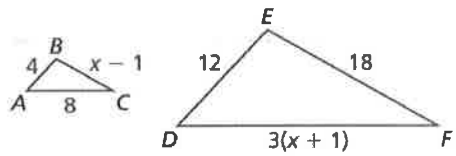
$\frac{AB}{DE} = \frac{BC}{EF} = \frac{CA}{FD}$ $\quad \frac{8}{6} = \frac{12}{9} = \frac{16}{12}$

$4/3 = 4/3 = 4/3$

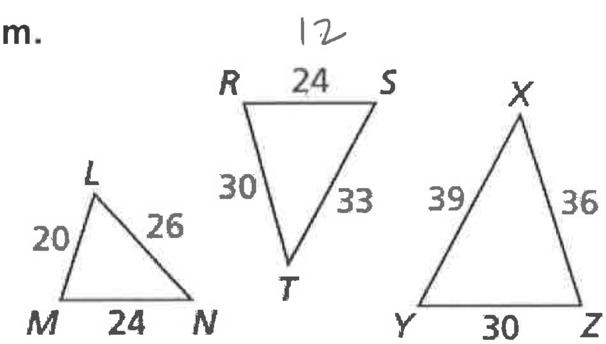
$\frac{AB}{GH} = \frac{BC}{HJ} = \frac{CA}{JG}$ $\quad \frac{8}{8} = \frac{12}{10} = \frac{16}{16}$

$1 \neq \frac{6}{5} \neq 1$

Find the value of x that makes $\triangle ABC \sim \triangle DEF$.



Use the diagram.



1. Which of the three triangles are similar? Write a similarity statement.

$\triangle LMN \sim \triangle YZX$

2. The shortest side of a triangle similar to $\triangle RST$ is 12 units long. Find the other side lengths of the triangle.

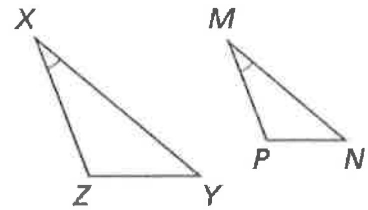
$\frac{12}{24} = \frac{x}{30}$ $\quad \frac{12}{24} = \frac{x}{33}$

$x = 15$ $\quad x = 16.5$

$\boxed{\text{15 units} \quad \text{16.5 units}}$

Theorem 8.5 Side-Angle-Side (SAS) Similarity Theorem

If an angle of one triangle is congruent to an angle of a second triangle and the lengths of the sides including these angles are proportional, then the triangles are similar.

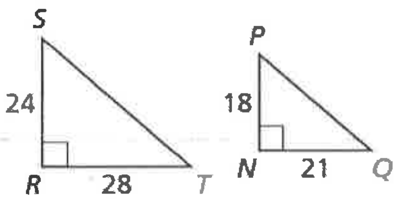


If $\angle X \cong \angle M$ and $\frac{ZX}{PM} = \frac{XY}{MN}$, then $\triangle XYZ \sim \triangle MNP$.

Proof Ex. 33, p. 443

Explain how to show that the indicated triangles are similar.

3. $\triangle SRT \sim \triangle PNQ$



$\angle R \cong \angle N$ and $\frac{SR}{PN} = \frac{RT}{NQ} = \frac{4}{3}$,

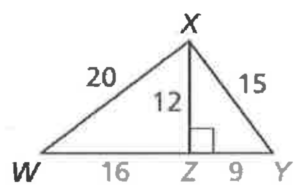
So $\triangle RST \sim \triangle NPQ$

4. $\triangle XZW \sim \triangle YZX$

$\frac{XZ}{YZ} = \frac{ZW}{ZX} = \frac{WX}{XY}$

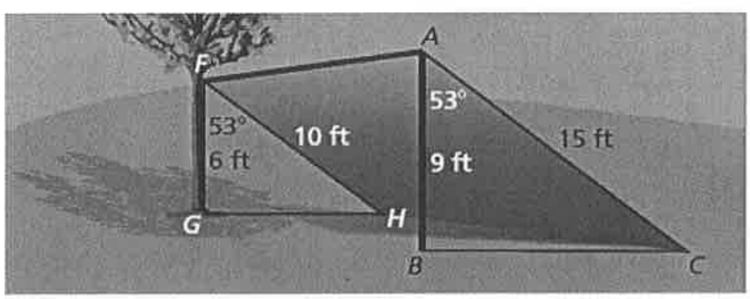
$\frac{12}{9} = \frac{16}{12} = \frac{20}{15}$

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



corresponding side lengths are proportional, so $\triangle XYZ \sim \triangle WXZ$

You are building a lean-to shelter starting from a tree branch, as shown. Can you construct the right end so it is similar to the left end using the angle measure and lengths shown?



$\frac{6}{9} = \frac{10}{15}$

$\frac{2}{3} = \frac{2}{3}$

Yes, you can.

the lengths of the sides that include $\angle A$ & $\angle F$ are proportional. So by SAS $\triangle ABC \sim \triangle FGH$.

Homework:

pg. 441 #3-6, 9-14, 17,18, 21-26