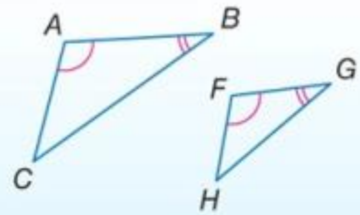
7.3 Similar Triangles

Postulate 7.1 **Angle-Angle (AA) Similarity**

If two angles of one triangle are congruent to two angles of another triangle, then the triangles are similar.

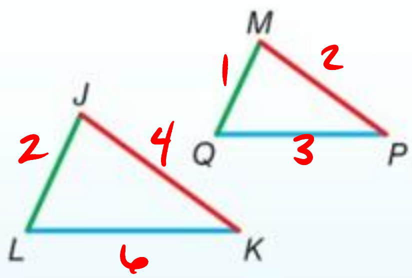
Example If $\angle A \cong \angle F$ and $\angle B \cong \angle G$, then $\triangle ABC \sim \triangle FGH$.



Side-Side-Side (SSS) Similarity

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

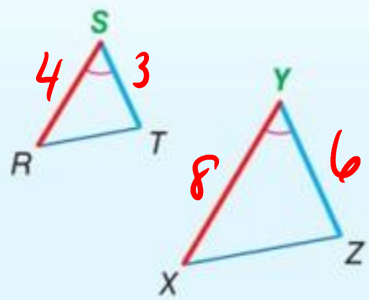
Example If $\frac{JK}{MP} = \frac{KL}{PQ} = \frac{LJ}{QM}$, then $\triangle JKL \sim \triangle MPQ$.



Side-Angle-Side (SAS) Similarity

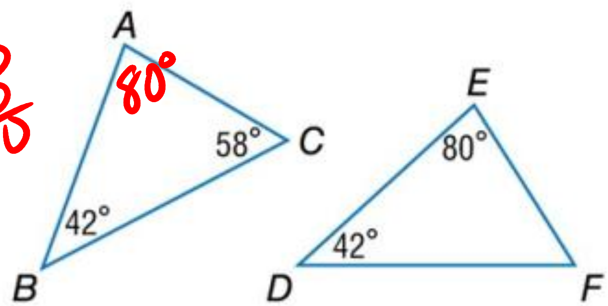
If the lengths of two sides of one triangle are proportional to the lengths of two corresponding sides of another triangle and the included angles are congruent, then the triangles are similar.

Example If $\frac{RS}{XY} = \frac{ST}{YZ}$ and $\angle S \cong \angle Y$, then $\triangle RST \sim \triangle XYZ$.



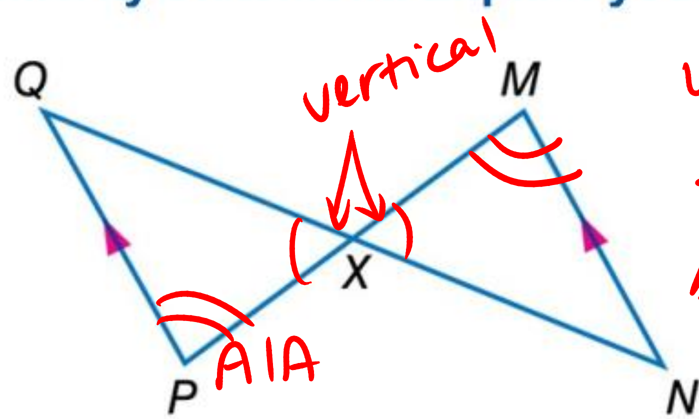
A. Determine whether the triangles are similar. If so, write a similarity statement. Explain your reasoning.

$$\begin{array}{r} 58 \\ +42 \\ \hline 100 \end{array} \qquad \begin{array}{r} 180 \\ -100 \\ \hline 80 \end{array}$$



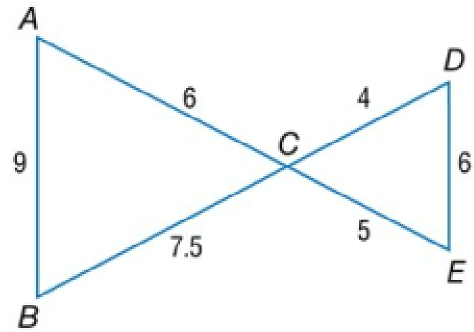
yes,
AA similarity
$\triangle ABC \sim \triangle EDF$

B. Determine whether the triangles are similar. If so, write a similarity statement. Explain your reasoning.



yes
AA
$\triangle QXP \sim \triangle NXM$

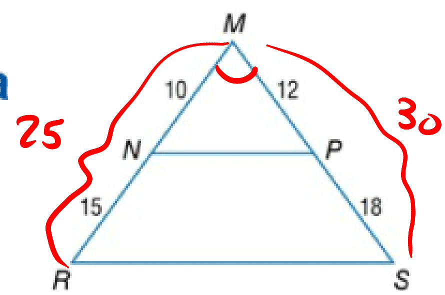
A. Determine whether the triangles are similar. If so, write a similarity statement. Explain your reasoning.



big $\dfrac{9}{6} = \dfrac{6}{5} = \dfrac{7.5}{4}$ small

$1.5 = 1.2 = 1.87$ no

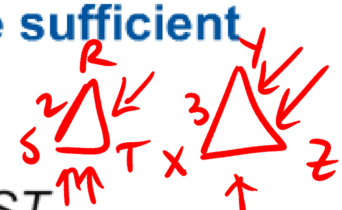
B. Determine whether the triangles are similar. If so, write a similarity statement. Explain your reasoning.



$\dfrac{10}{25} = \dfrac{12}{30}$ yes SAS

$.4 = .4$ $\triangle NMP \sim \triangle RMS$

If ΔRST and ΔXYZ are two triangles such that $\dfrac{RS}{XY} = \dfrac{2}{3}$, which of the following would be sufficient to prove that the triangles are similar?



A $\dfrac{RT}{XZ} = \dfrac{ST}{YZ}$

B $\dfrac{RS}{XY} = \dfrac{RT}{XZ} = \dfrac{ST}{YZ}$
S S S

~~**C**~~ $\angle R \cong \angle S$

D $\dfrac{RS}{RT} = \dfrac{XY}{XZ}$

ALGEBRA **Given $\overline{RS} \parallel \overline{UT}$, $RS = 4$, $RQ = x + 3$, $QT = 2x + 10$, $UT = 10$, find RQ and QT.**

$$\frac{x+3}{2x+10} = \frac{4}{10}$$

$$10(x+3) = 4(2x+10)$$

$$10x+30 = 8x+40$$

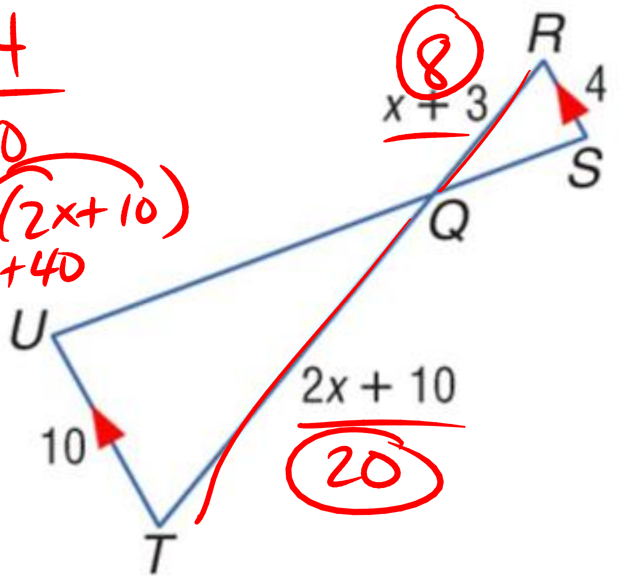
$$-8x \qquad -8x$$

$$2x+30=40$$

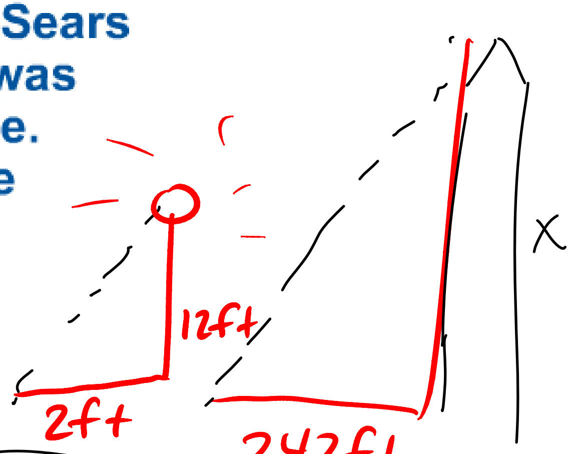
$$-30 \quad -30$$

$$\frac{2x}{2}=\frac{10}{2}$$

$$x=5$$



SKYSCRAPERS **Josh wanted to measure the height of the Sears Tower in Chicago. He used a 12-foot light pole and measured its shadow at 1 p.m. The length of the shadow was 2 feet. Then he measured the length of Sears Tower's shadow and it was 242 feet at the same time. What is the height of the Sears Tower?**



$$\frac{2}{242} = \frac{12}{x}$$

$$\frac{2x}{2}=\frac{2904}{2}$$

$x = 1452$ft

Reflexive Property of Similarity	$\triangle ABC \sim \triangle ABC$
Symmetric Property of Similarity	If $\triangle ABC \sim \triangle DEF$, then $\triangle DEF \sim \triangle ABC$.
Transitive Property of Similarity	If $\triangle ABC \sim \triangle DEF$, and $\triangle DEF \sim \triangle XYZ$, then $\triangle ABC \sim \triangle XYZ$.