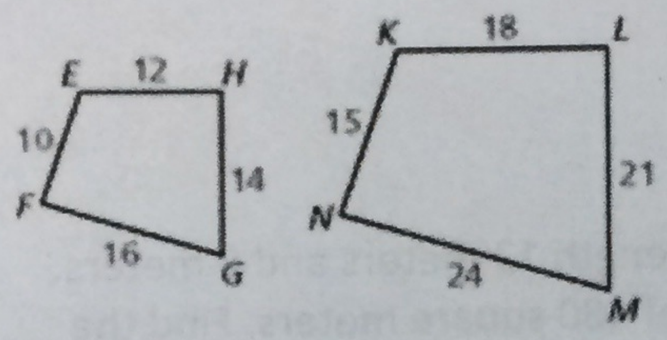
Name: key Date: Band:
Geometry

Unit 6: Similarity Study Guide

6.1 Similar Polygons

1. In the diagram, $EHGF \sim KLMN$. Find the scale factor from $EHGF$ to $KLMN$. Then list all pairs of congruent angles and write the ratios of the corresponding side lengths in a statement of proportionality.



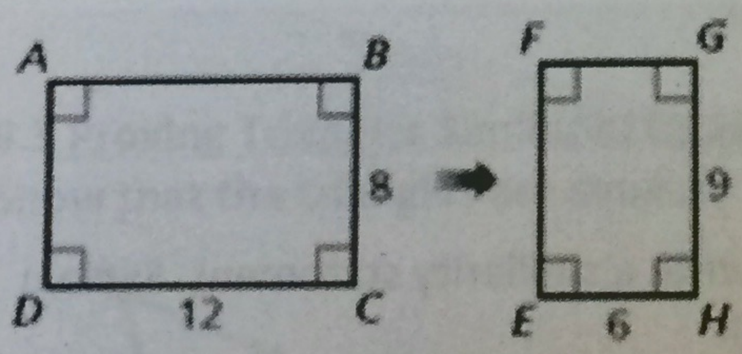
$\frac{12}{18} = \frac{10}{15} = \frac{14}{21} = \frac{16}{24} = \boxed{\frac{2}{3} = \text{scale factor}}$

$\cong$ corresponding $\angle$'s: $\angle E \cong \angle K, \angle H \cong \angle L, \angle F \cong \angle N, \angle G \cong \angle M$

statement of proportionality: $\frac{EH}{KL} = \frac{HG}{LM} = \frac{FG}{NM} = \frac{EF}{KN}$

Find the scale factor. Then list all pairs of congruent angles and write the ratios of the corresponding side lengths in a statement of proportionality.

2. $ABCD \sim EFGH$

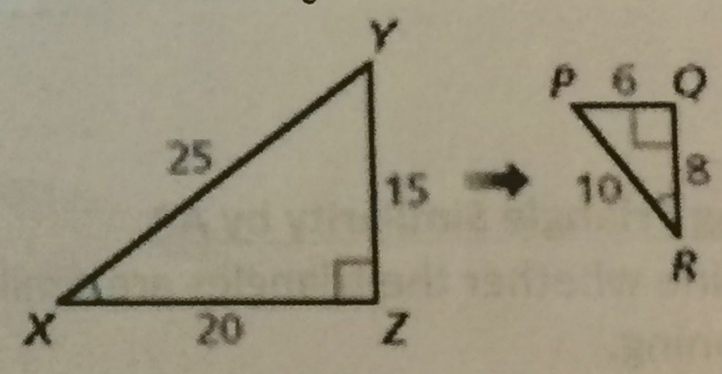


$\frac{CD}{GH} = \frac{12}{9} = \boxed{\frac{4}{3} = \text{scale factor}}$

$\angle A \cong \angle E, \angle B \cong \angle F, \angle C \cong \angle G, \angle D \cong \angle H$

$\frac{AB}{EF} = \frac{BC}{FG} = \frac{CD}{GH} = \frac{DA}{HE}$

3. $\Delta XYZ \sim \Delta RPQ$



$\frac{XY}{RP} = \frac{25}{10} = \boxed{\frac{5}{2} = \text{scale factor}}$

$\angle X \cong \angle R, \angle Y \cong \angle P, \angle Z \cong \angle Q$

4. Two similar triangles have a scale factor of 3: 5. The altitude of the larger triangle is 24 inches. What is the altitude of the smaller triangle?

$\frac{3}{5} = \frac{a}{24}$

$5a = 72$

$a = 14.4 in$

5. Two similar triangles have a pair of corresponding sides of length 12 meters and 8 meters. The larger triangle has a perimeter of 48 meters and an area of 180 square meters. Find the perimeter and area of the smaller triangle.

$\frac{12}{8} = \frac{48}{P}$

$12P = 384$

$P = 32 m$

$\left(\frac{12}{8}\right)^2 = \frac{180}{a}$

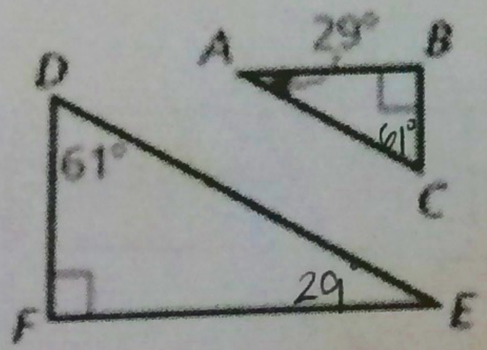
$\frac{144}{64} = \frac{180}{a}$

$144a = 11520$

$a = 80 m^2$

6.2 Proving Triangle Similarity by AA

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



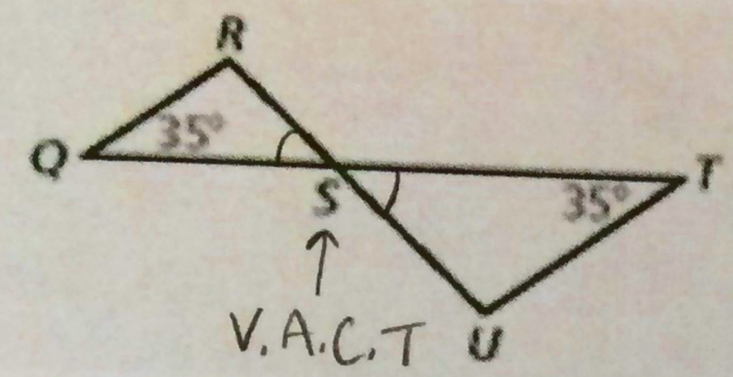
Similar because of AA~.

Similarity statement: $\triangle ABC \sim \triangle EFD$

Reasoning: AA~

Show that the triangles are similar. Write a similarity statement.

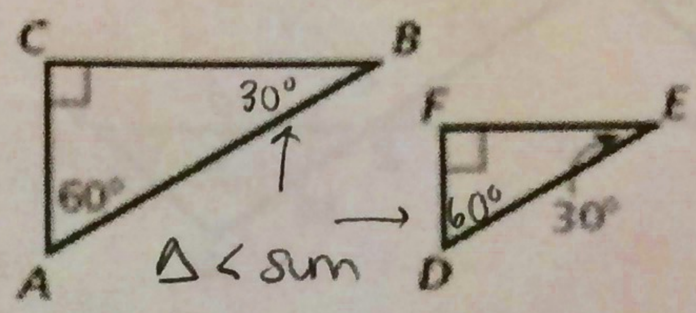
7.



AA~

△QRS~△TUS

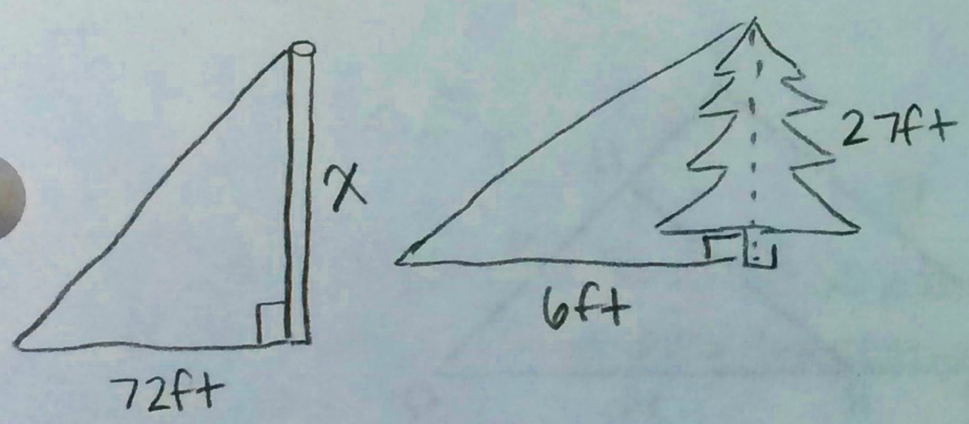
8.



AA~

△ABC~△DEF

9. A cellular telephone tower casts a shadow that is 72 feet long, while a nearby tree that is 27 feet tall casts a shadow that is 6 feet long. How tall is the tower?



$\frac{72}{6} = \frac{x}{27}$

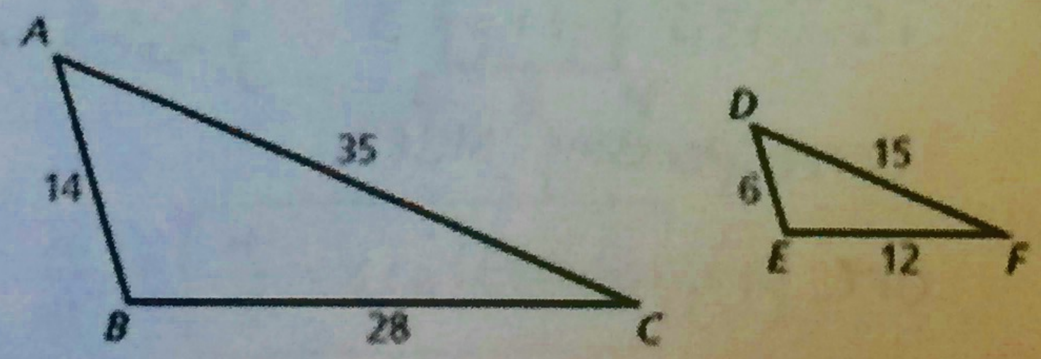
$6x = 1944$

$x = 324ft$

6.3 Proving Triangles Similarity by SSS and SAS

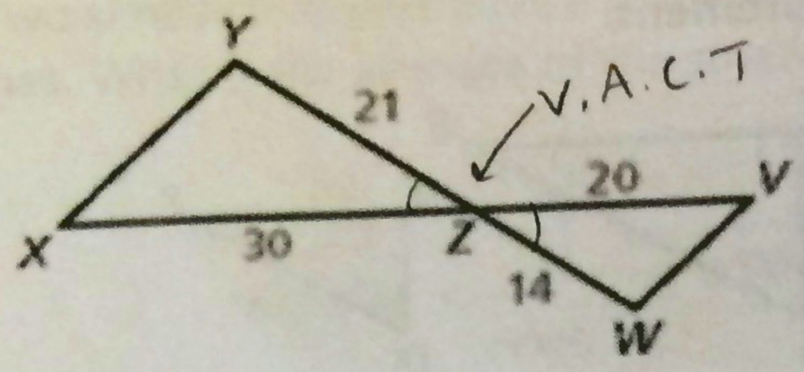
Show that the triangles are similar.

10.



$\frac{14}{6} = \frac{28}{12} = \frac{35}{15} = \frac{7}{3}$ SSS~

corresponding sides are proportional



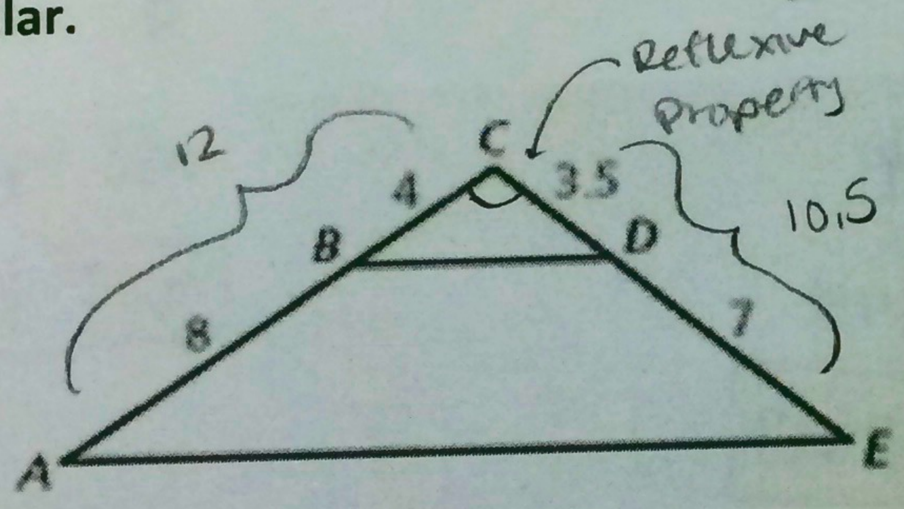
11.

$\frac{14}{21} = \frac{20}{30} = \frac{2}{3}$

corresponding sides are proportional

SAS~

Use the SSS Similarity Theorem or the SAS Similarity Theorem to show that the triangles are similar.

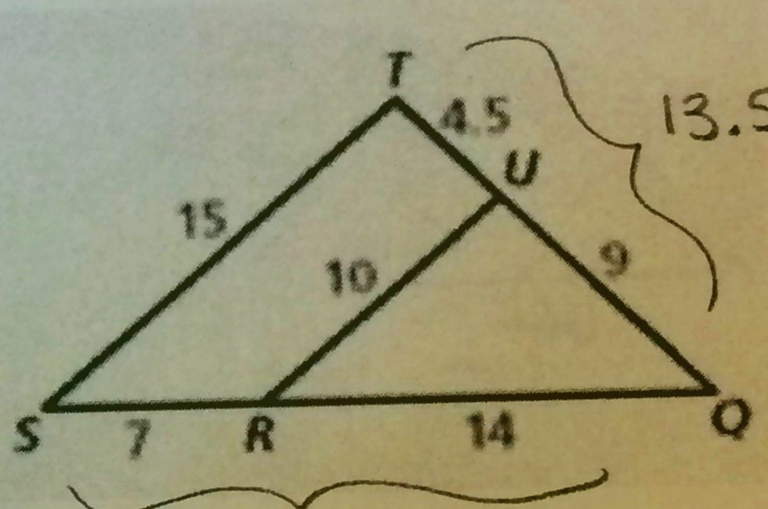


12.

$\frac{4}{12} = \frac{3.5}{10.5} = \frac{1}{3}$

corresponding sides are proportional

SAS~



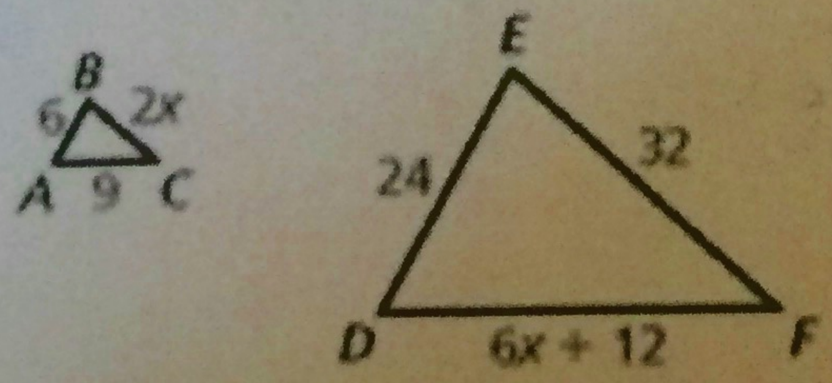
13.

$\frac{10}{15} = \frac{9}{13.5} = \frac{14}{21} = \frac{2}{3}$

SSS~

corresponding sides are proportional

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



$\frac{6}{24} = \frac{2x}{32}$

$48x = 192$

$x = 4$

OR

$\frac{6}{24} = \frac{9}{6x+12}$

$36x + 72 = 216$

$36x = 144$

$x = 4$