NAME _____ DATE _____ PERIOD _____

7-3 Similar Triangles

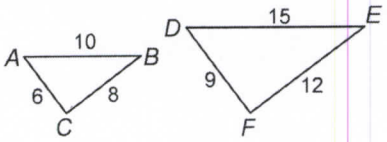
Target: Use proportions to find missing parts of similar triangles

Identify Similar Triangles

Here are three ways to show that two triangles are similar.

AA Similarity	Two angles of one triangle are congruent to two angles of another triangle.
SSS Similarity	The measures of the corresponding side lengths of two triangles are proportional.
SAS Similarity	The measures of two side lengths of one triangle are proportional to the measures of two corresponding side lengths of another triangle, and the included angles are congruent.

Example 1 **Determine whether the triangles are similar.**



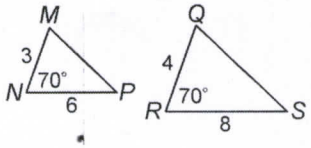
$\frac{AC}{DF} = \frac{6}{9} = \frac{2}{3}$

$\frac{BC}{EF} = \frac{8}{12} = \frac{2}{3}$

$\frac{AB}{DE} = \frac{10}{15} = \frac{2}{3}$

$\triangle ABC \sim \triangle DEF$ by SSS Similarity.

Example 2 **Determine whether the triangles are similar.**



$\frac{3}{4} = \frac{6}{8}$, so $\frac{MN}{QR} = \frac{NP}{RS}$.

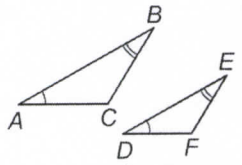
$m\angle N = m\angle R$, so $\angle N \cong \angle R$.

$\triangle NMP \sim \triangle RQS$ by SAS Similarity.

Exercises

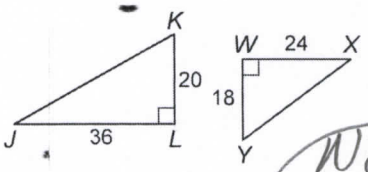
Determine whether the triangles are similar. If so, write a similarity statement. Explain your reasoning.

1.



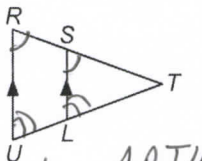
Yes, $\triangle ABC \sim \triangle DEF$ (AA)

2.



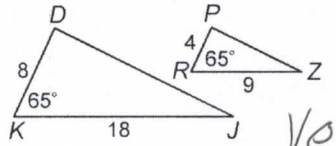
No $\frac{36 \div 12}{24 \div 12} = \frac{3}{2}$ $\frac{20 \div 2}{18 \div 2} = \frac{10}{9}$

3.



Yes $\triangle RTU \sim \triangle STL$ (AA)

4.

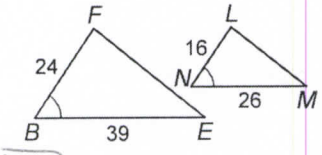


$\frac{4}{8} = \frac{1}{2}$ $\frac{9}{18} = \frac{1}{2}$

Yes $\triangle KDJ \sim \triangle RPZ$

SAS

5.



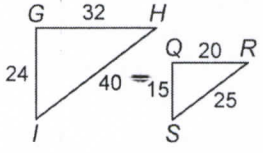
$\frac{16 \div 8}{24 \div 8} = \frac{2}{3}$

$\frac{26 \div 13}{39 \div 13} = \frac{2}{3}$

Yes $\triangle BFE \sim \triangle NLM$

SAS

6.



$\frac{24 \div 3}{15 \div 3} = \frac{8}{5}$

$\frac{32 \div 4}{20 \div 4} = \frac{8}{5}$

$\frac{40 \div 5}{25 \div 5} = \frac{8}{5}$

Yes $\triangle IGH \sim \triangle SQR$

SSS

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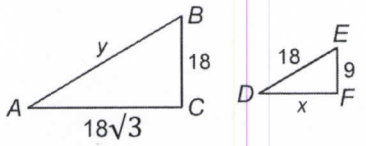
7-3 Similar Triangles

Use Similar Triangles

Similar triangles can be used to find measurements.

Example 1 **$\triangle ABC \sim \triangle DEF$. Find the values of x and y.**



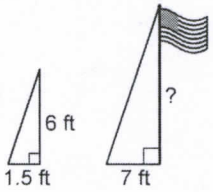
$$\frac{AC}{DF} = \frac{BC}{EF} \qquad \frac{AB}{DE} = \frac{BC}{EF}$$

$$\frac{18\sqrt{3}}{x} = \frac{18}{9} \qquad \frac{y}{18} = \frac{18}{9}$$

$$18x = 9(18\sqrt{3}) \qquad 9y = 324$$

$$x = 9\sqrt{3} \qquad y = 36$$

Example 2 **A person 6 feet tall casts a 1.5-foot-long shadow at the same time that a flagpole casts a 7-foot-long shadow. How tall is the flagpole?**

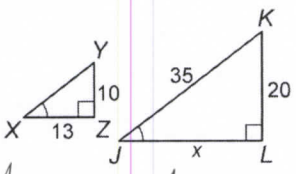


The Sun's rays form similar triangles.
Using x for the height of the pole, $\frac{6}{x} = \frac{1.5}{7}$,
so $1.5x = 42$ and $x = 28$.
The flagpole is 28 feet tall.

Exercise

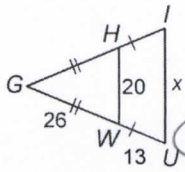
ALGEBRA find each measure.

1. *JL*



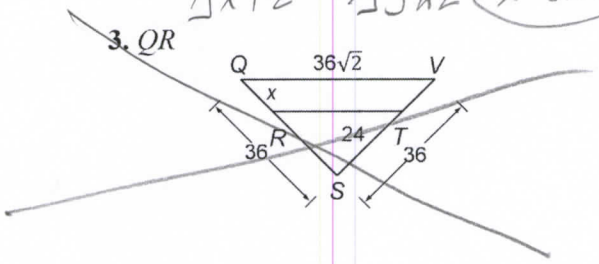
△XYZ ~ △JKL X=28.7

2. *IU*

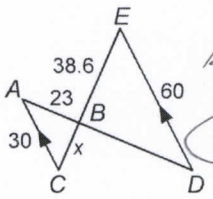


△GIU ~ △GHW X=30

3. *QR*

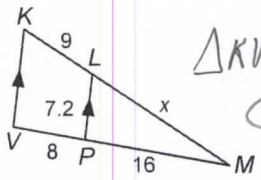


4. *BC*



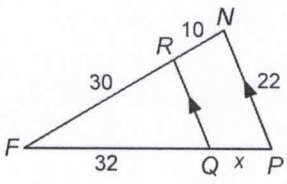
△BED ~ △BCA X=19.3

5. *LM*



△KVM ~ △LPM X=18

6. *QP*



△FRQ ~ △FNP X=10.6

7. The heights of two vertical posts are 2 meters and 0.45 meter. When the shorter post casts a shadow that is 0.85 meter long, what is the length of the longer post's shadow to the nearest hundredth?

3.78m