

EXPECTATION 1 – SIMILAR TRIANGLES

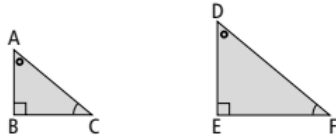
[Watch instructional video on Similarity](#) (up until the 5:30 mark)

Read the following:

Working Example 1: Identify Similar Triangles

corresponding angles and corresponding sides

- angles and sides that are in matching positions
- example:



corresponding angles:

- $\angle A$ and $\angle D$
- $\angle B$ and $\angle E$
- $\angle C$ and $\angle F$

corresponding sides:

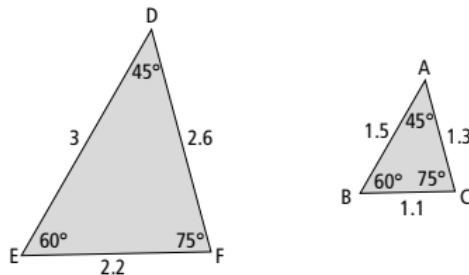
- AB and DE
- BC and EF
- AC and DF



similar figures

- have the same shape but different size
- all corresponding angles are equal
- all corresponding sides are proportional
- example:

Proportional means the ratio of the corresponding sides is equal.



equal angles:

- $\angle A = \angle D$
- $\angle B = \angle E$
- $\angle C = \angle F$

proportional sides:

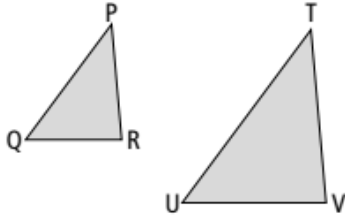
- $DE = 2 \times AB$
- $DF = 2 \times AC$
- $EF = 2 \times BC$

Complete the following practice examples:

1.

List the corresponding angles and the corresponding sides for each pair of triangles.

a) $\triangle PQR$ and $\triangle TUV$



$\angle P$ corresponds to \angle _____.

_____ corresponds to \angle _____.

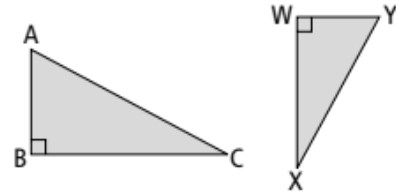
_____ corresponds to \angle _____.

PQ corresponds to _____.

_____ corresponds to _____.

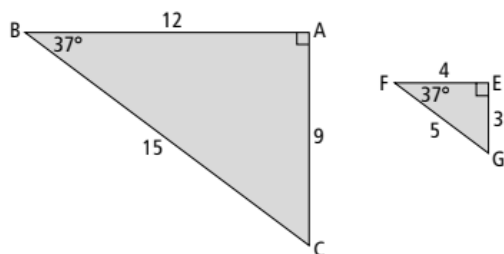
_____ corresponds to _____.

b) $\triangle ABC$ and $\triangle WXY$



2.

Is $\triangle EFG$ similar to $\triangle ABC$?



Solution

Compare **corresponding angles**:

$\angle A = \underline{\hspace{2cm}}^\circ$ and $\angle E = \underline{\hspace{2cm}}^\circ$

$\angle B = \underline{\hspace{2cm}}^\circ$ and $\angle F = \underline{\hspace{2cm}}^\circ$

$\angle C = 180 - 37 - 90 = \underline{\hspace{2cm}}^\circ$ and $\angle G = \underline{\hspace{2cm}}^\circ$

The sum of the angles in a triangle = 180° .
To find the missing angle, subtract the 2 given angles from 180° .

Are the corresponding angles equal? Circle YES or NO.

Compare **corresponding sides**:

$\frac{AB}{EF} = \frac{12}{4}$	$\frac{BC}{FG} = \frac{15}{\boxed{\hspace{2cm}}}$	$\frac{AC}{EG} = \frac{\boxed{\hspace{2cm}}}{\boxed{\hspace{2cm}}}$
= 3	= <u> </u>	= <u> </u>

The corresponding sides are proportional with a scale factor of 3.

$\triangle EFG \sim \triangle ABC$

\sim means *is similar to*

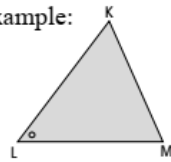
WWW Web Link

To learn more about properties of similar triangles, go to www.mathlinks9.ca and follow the links.

Literacy Link

naming an angle

- use 3 capital letters; the middle letter must be the point where the 2 lines meet
- or
- use only the middle letter
- example:

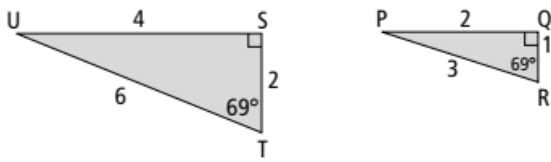


$\angle KLM$ or $\angle L$

3.

Is each pair of triangles similar? Show how you know.

a)



$$\begin{aligned} \angle U &= 180^\circ - 90^\circ - \text{_____}^\circ \\ &= \text{_____}^\circ \end{aligned}$$

$\angle P$ and $\angle U$ measure _____ $^\circ$.

$\angle Q = \text{_____}^\circ$ and $\angle \text{_____} = \text{_____}^\circ$

$\angle R = \text{_____}^\circ$ and $\angle \text{_____} = \text{_____}^\circ$

Corresponding angles are _____.
(*equal or not equal*)

$$\frac{PQ}{US} = \frac{2}{\boxed{}}$$

= _____

$$\frac{QR}{ST} = \frac{1}{\boxed{}}$$

= _____

$$\frac{PR}{\boxed{}} = \frac{3}{6}$$

= _____

The scale factor is _____.

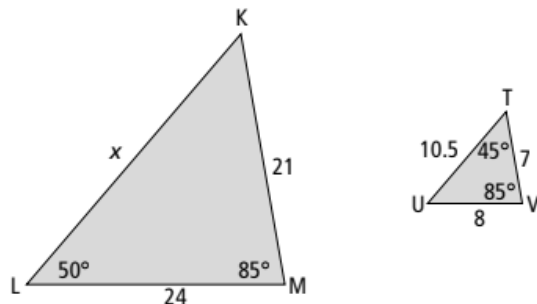
Are the triangles similar? Circle YES or NO. Give 1 reason for your answer.

Read and complete the following:

4.

Working Example 2: Use Similar Triangles to Determine a Missing Side Length

Kyle is drawing triangles for a math puzzle.



a) Are the triangles similar?

Solution

Check to see if the corresponding angles are equal.
The measures of $\angle K$ and $\angle U$ are missing.

$$\angle K = 180^\circ - 50^\circ - 85^\circ$$

$$= \underline{\hspace{2cm}}^\circ$$

$$\angle U = 180^\circ - \underline{\hspace{2cm}}^\circ - \underline{\hspace{2cm}}^\circ$$

$$= \underline{\hspace{2cm}}^\circ$$

$$\angle K = \underline{\hspace{2cm}}^\circ \text{ and } \angle \underline{\hspace{2cm}} = \underline{\hspace{2cm}}^\circ$$

$$\angle L = \underline{\hspace{2cm}}^\circ \text{ and } \angle \underline{\hspace{2cm}} = \underline{\hspace{2cm}}^\circ$$

$$\angle M = \underline{\hspace{2cm}}^\circ \text{ and } \angle \underline{\hspace{2cm}} = \underline{\hspace{2cm}}^\circ$$

The sum of the angles
in a triangle = 180° .

Are the corresponding angles equal? Circle YES or NO.

Are the triangles similar? Circle YES or NO.

To prove the shapes are similar, show that the corresponding *angles* are similar *or* the corresponding *sides* are similar. You do not need to show both.

b) What is the missing side length?

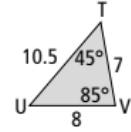
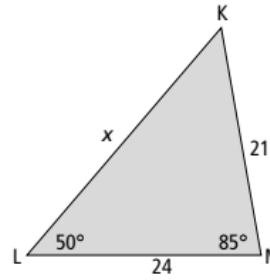
Solution

Compare corresponding sides to find the scale factor.

$$\frac{LM}{UV} = \frac{24}{8}$$

$$\frac{KM}{TV} = \frac{21}{7}$$

$$\frac{KL}{TU} = \frac{\boxed{}}{10.5}$$



$$= \underline{\hspace{2cm}} \qquad = \underline{\hspace{2cm}} \qquad = ?$$

The scale factor is _____.

Solve for the unknown side length.

Method 1: Use a Scale Factor

Since the triangles are similar, use the scale factor to find the missing side length.

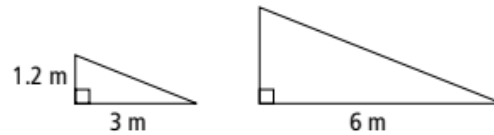
$$\frac{x}{10.5} = 3$$

$? \div 10.5 = 3$
 Think of the opposite: $3 \times 10.5 = ?$

The missing side length is _____ units.

5.

Sam is building 2 bike ramps.
 They are different sizes, but they are similar.
 How high is the larger ramp?



EXPECTATION 2 – SIMILAR POLYGONS

Read and complete the following:

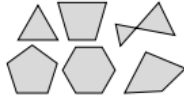
1.



polygon

• a 2-dimensional figure with 3 or more sides

• examples:



Link the Ideas

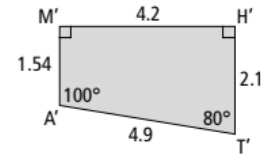
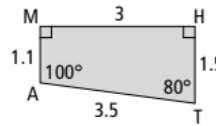
Similar polygons have

- corresponding angles that are equal
- corresponding side lengths with the same scale factor

Working Example 1: Identify Similar Polygons

The 2 quadrilaterals look similar.

Is $M'A'T'H'$ a true enlargement of $MATH$? Explain.



Solution

Compare corresponding angles:



$\angle M = \underline{\hspace{2cm}}^\circ$ and $\angle M' = \underline{\hspace{2cm}}^\circ$ $\angle A = \underline{\hspace{2cm}}^\circ$ and $\angle A' = \underline{\hspace{2cm}}^\circ$

$\angle T = \underline{\hspace{2cm}}^\circ$ and $\angle T' = \underline{\hspace{2cm}}^\circ$ $\angle H = \underline{\hspace{2cm}}^\circ$ and $\angle H' = \underline{\hspace{2cm}}^\circ$

Literacy Link
A quadrilateral is a shape with 4 sides.

Compare corresponding sides:

MA corresponds to _____. AT corresponds to _____.

HT corresponds to _____. MH corresponds to _____.

Find the scale factor.

$$\frac{M'A'}{MA} = \frac{1.54}{1.1}$$

$$\frac{A'T'}{\boxed{\hspace{1cm}}} = \frac{4.9}{\boxed{\hspace{1cm}}}$$

$$\frac{H'T'}{\boxed{\hspace{1cm}}} = \frac{2.1}{\boxed{\hspace{1cm}}}$$

$$\frac{M'H'}{\boxed{\hspace{1cm}}} = \frac{4.2}{\boxed{\hspace{1cm}}}$$

= _____

= _____

= _____

= _____

The scale factor is _____.

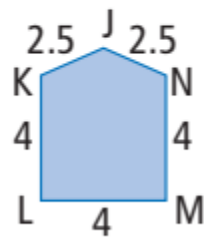
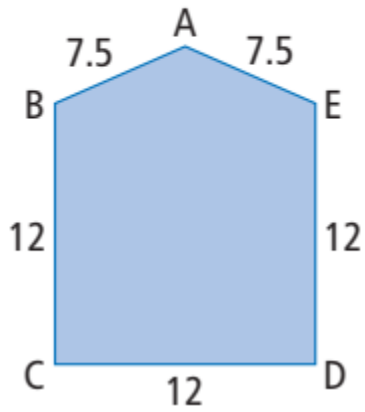
$M'A'T'H'$ is an enlargement of $MATH$ by a scale factor of _____.

Complete the following:

2.

Decide if each pair of polygons is similar.
Show your reasoning.

a)

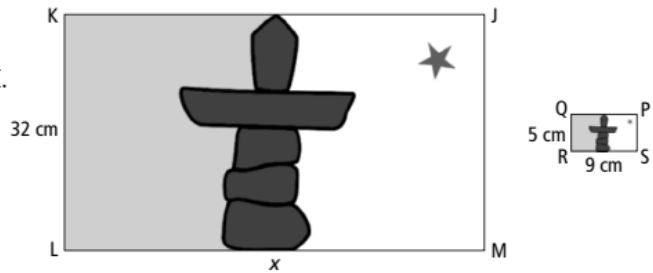


Read and complete the following:

3.

Working Example 2: Determine a Missing Side Length

Jason has 2 Nunavut flags.
 Rectangle JKLM is similar to rectangle PQRS.
 Find the missing side length of rectangle JKLM.



Solution

Since the rectangles are similar, set up a proportion to find the missing side length.

$$\frac{KL}{QR} = \frac{LM}{RS}$$

$\times 1.8$ 9 ÷ 5 = 1.8
 $\frac{32}{5} = \frac{x}{9}$
 $\times 1.8$

$$32 \times 1.8 = x$$

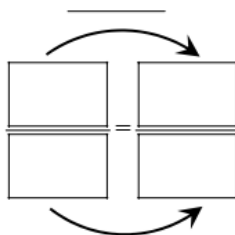
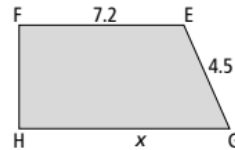
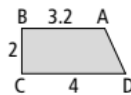
$$\underline{\hspace{2cm}} = x$$

The missing side length is cm.

Show You Know

The 2 trapezoids are similar.
 Find the missing side length.

$$\frac{AB}{EF} = \frac{DC}{GH}$$



The missing side length is units.