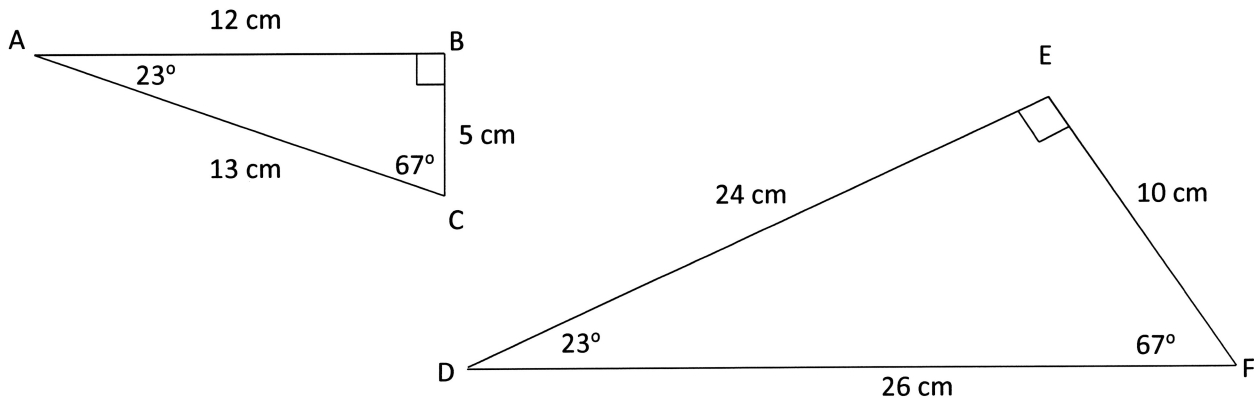


Similar Triangles – Introduction

In general, two triangles are considered to be similar if one triangle is a magnified (enlarged) version of the other.

For example, consider the following two triangles:



From these two triangles, we can see that $\triangle DEF$ is an enlarged copy of $\triangle ABC$; therefore, the two triangles are similar. Mathematically, this statement of similarity can be written _____. Note that the order for which we write the letters is VERY important.

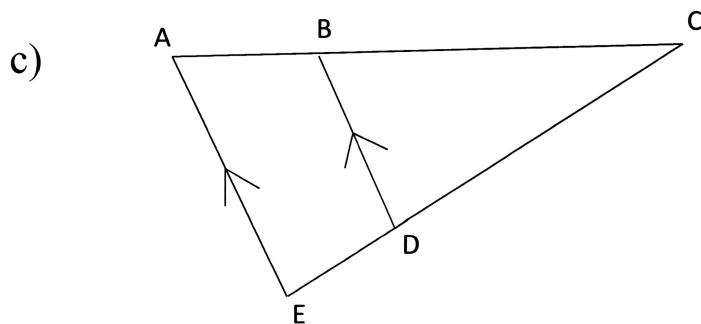
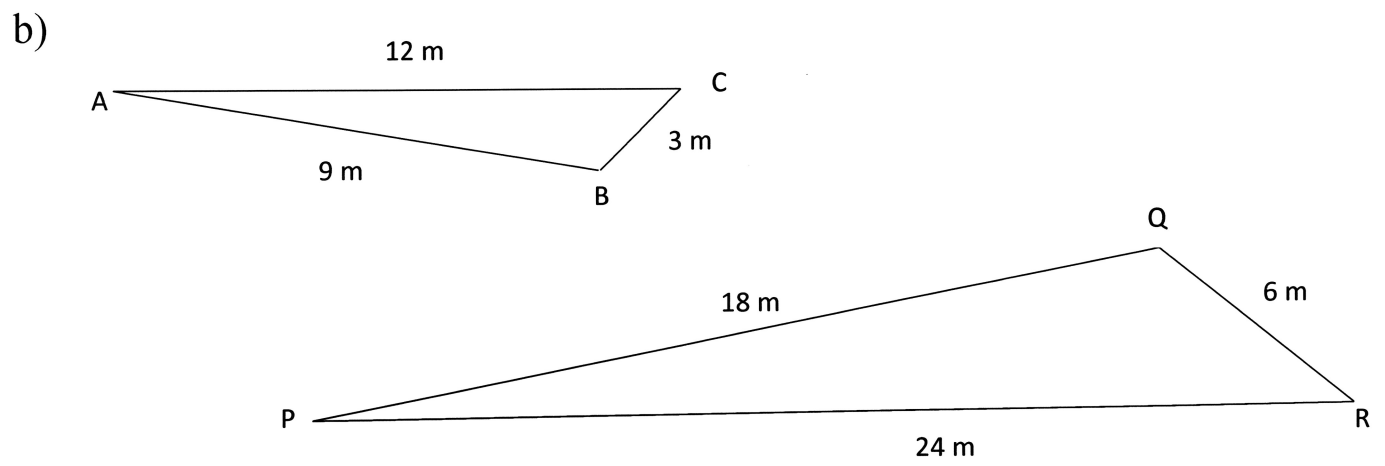
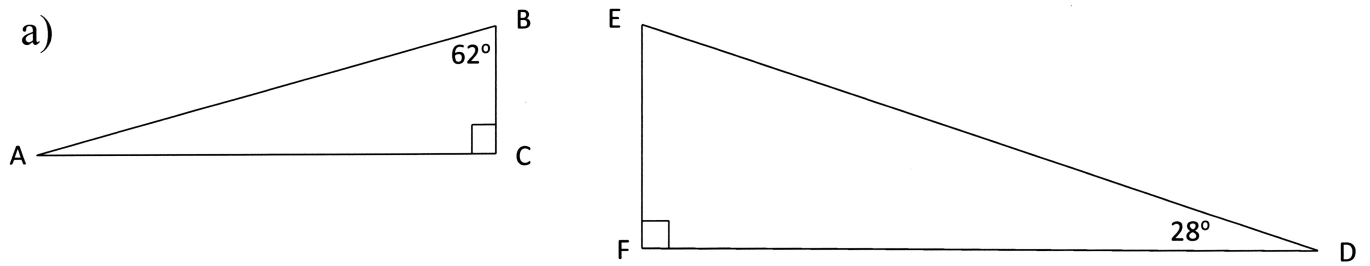
Quantitatively, two triangles are considered to be similar if either of the following two statements are true:

1. The lengths of the three sides of one triangle are _____ to the lengths of the corresponding three sides in the other triangle. For the example above, we may write _____.
2. The three angles in one triangle are equal to the corresponding three angles in the other triangle. For the example above,
 -
 -
 -

It is important to note that, if one of the above statements is true, then the triangles are _____ and the other statement must also be true.

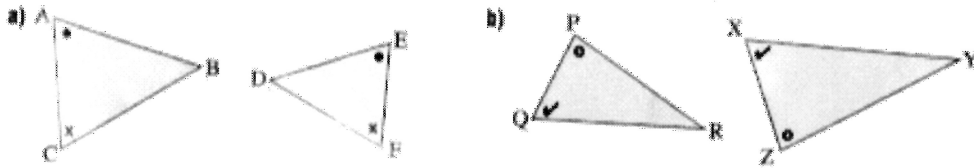
Examples

Prove that the following pairs of triangles are similar.

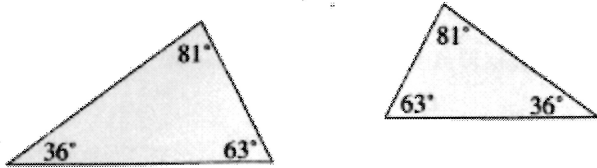


Introduction to Similar Triangles – Practice

1. For each pair of similar triangles, list the corresponding sides and angles.

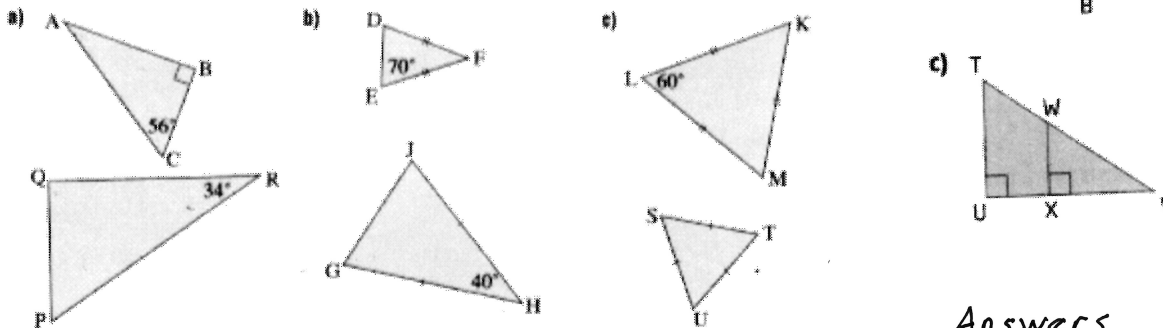


2. These triangles have the same shape, but different orientations.

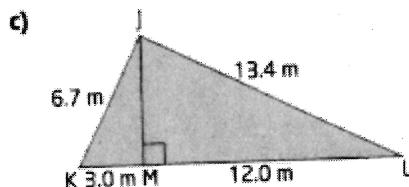
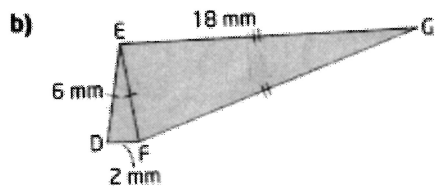
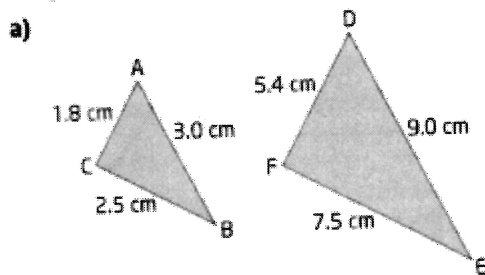


Are the triangles similar? Explain.

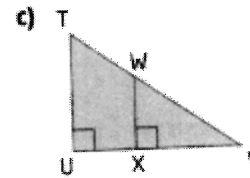
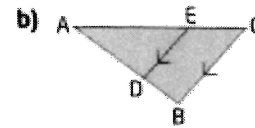
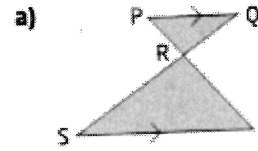
3. The triangles in each pair are similar. In each case, state the measures of the angles that are not marked.



4. Name a pair of similar triangles in each diagram and explain why they are similar.



5. Name a pair of similar triangles in each diagram and explain why they are similar.



Answers

1. a) $\angle A = \angle E$, $\angle B = \angle D$, $\angle C = \angle F$; AB corresponds to ED; BC corresponds to DF; CA corresponds to FE.

b) $\angle P = \angle X$, $\angle Q = \angle Z$, $\angle Y = \angle R$; PQ corresponds to ZX; QR corresponds to XY; RP corresponds to YZ.

2. Yes

3. a) $\angle A = 34^\circ$, $\angle P = 56^\circ$, $\angle Q = 90^\circ$

b) $\angle D = 70^\circ$, $\angle F = 40^\circ$, $\angle J = 70^\circ$, $\angle G = 70^\circ$

c) $\angle K = 60^\circ$, $\angle M = 60^\circ$, $\angle S = 60^\circ$, $\angle T = 60^\circ$, $\angle U = 60^\circ$

4. a) $\triangle ABC \sim \triangle DEF$; ratios of corresponding sides are all equal to $\frac{1}{3}$.

b) $\triangle DEF \sim \triangle EGF$; ratios of corresponding sides are all equal to $\frac{1}{3}$.

c) $\triangle JKM \sim \triangle LJM$; ratios of corresponding sides are all equal to $\frac{1}{2}$.

5. a) $\triangle PQR \sim \triangle TSR$; $\angle P = \angle T$ and $\angle Q = \angle S$ because they are alternate angles. Also, $\angle PRQ = \angle TRS$ because they are opposite angles.

b) $\triangle ABC \sim \triangle ADE$; $\angle A$ is common to both triangles; $\angle B = \angle D$ and $\angle C = \angle E$ because they are corresponding angles of parallel lines.

c) $\triangle TUV \sim \triangle WXV$; $\angle V$ is common to both triangles. $\angle U = \angle X$ because they are both right angles. Also, $\angle T = \angle W$ because they are corresponding angles of parallel lines.