Worksheet 2-1: Properties of Similar Triangles

Two triangles are similar if

> Do you know how to name the sides and angles of a triangle?

(i) **the corresponding angles are equal**

and

(ii) **the lengths of the corresponding sides are proportional.**

$\triangle\textbf{ABC} \sim \triangle\textbf{PQR}$ (Triangle ABC is similar to Triangle PQR)
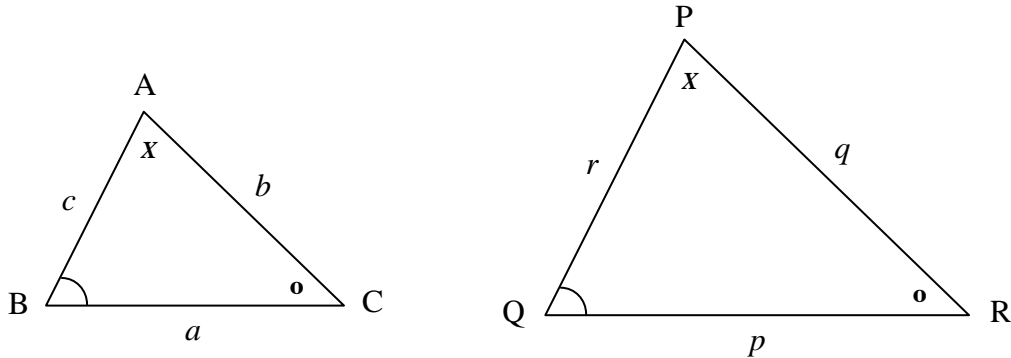
So, $\angle A = \angle P$

$\angle B = \angle Q$

$\angle C = \angle R$

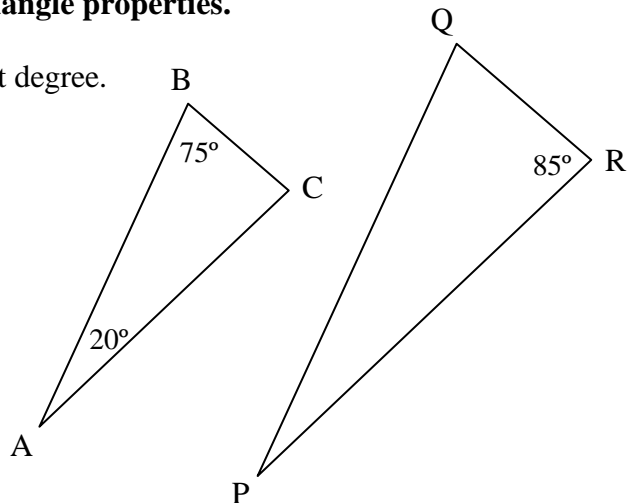> Here, we can see that the corresponding angles are the **same**.

Also, $\dfrac{AB}{PQ} = \dfrac{AC}{PR} = \dfrac{BC}{QR}$ or $\dfrac{c}{r} = \dfrac{b}{q} = \dfrac{q}{p}$

> Remember that the corresponding sides are **proportional** in length, but not the same in length.

Example 1: Find the missing angles using similar triangle properties.
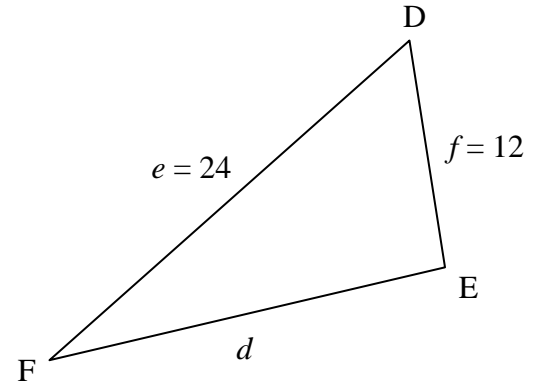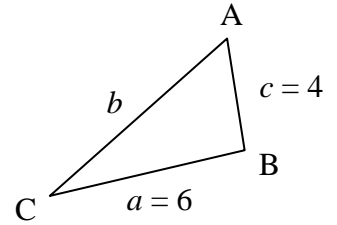Given: $\triangle ABC \sim \triangle PQR$.
Find the measures of $\angle C$, $\angle P$, and $\angle Q$, to the nearest degree.

Assigned Work: WS 2-1; Text: p. 26 #3-6, #8-10
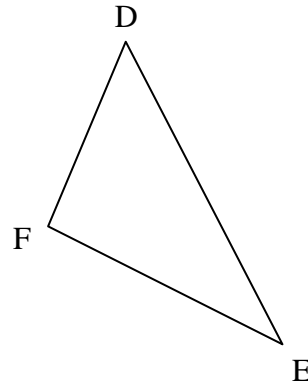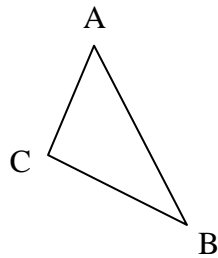
Example 2: Find the missing sides using similar triangle properties.
Given $\triangle ABC \sim \triangle DEF$.
Find the length of sides b and d. **The measures are in centimetres**.

A

b $c = 4$

                                B

C $a = 6$

D

$e = 24$ $f = 12$

                                E

F d

Example 3: Find missing sides and angles using similar triangle properties.
Complete each statement about the given pair of similar triangles.

A   D

C

        B   F

                                    E

$\triangle$ _____ $\sim$ $\triangle$ _____

(a) $\dfrac{AB}{DE} = \dfrac{AC}{?}$ (b) $\dfrac{BC}{EF} = \dfrac{?}{DF}$ (c) $\dfrac{AC}{DF} = \dfrac{AB}{?}$

(d) $\angle A = \angle\,?$ (e) $\angle B = \angle\,?$ (f) $\angle F = \angle\,?$

Practice:

1. How do you know that two triangles are similar when only the angle measures of the two triangles are given?

2. How do you know that two triangles are similar when only the side lengths of the two triangles are given?

3. In $\triangle MNP$, $m = 7\,\text{cm}$, $n = 6\,\text{cm}$, and $p = 4\,\text{cm}$. In $\triangle HJK$, $h = 17.5\,\text{cm}$, $j = 15\,\text{cm}$, and $k = 10\,\text{cm}$. Show that $\triangle MNP \sim \triangle HJK$. (Hint: Sketch and label the two triangles.)

4. Given $\triangle ABC \sim \triangle DEF$, find the measure of $\angle C$ and the length of DE to the nearest tenth of a unit.
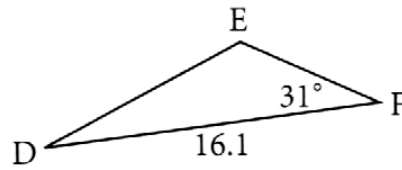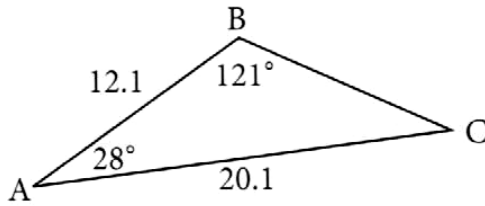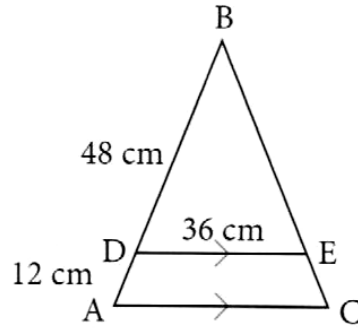
5. Find the length of FG to the nearest tenth of a unit.
   **Note: When the two triangles are not stated "similar" in a question, you MUST prove
      that they are similar before you can apply the similar triangle properties.**
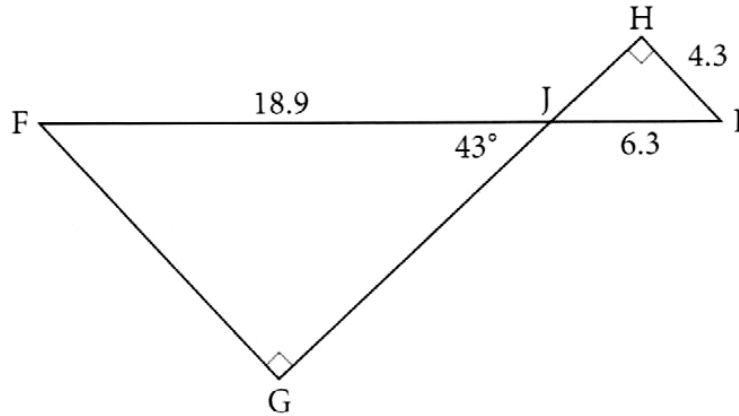
6. In the diagram, DE is parallel to AC. Find the length of AC.