AChor/MPM2D **Name: _____**
Date: _____

Worksheet 6-1: Properties of Similar Triangles

Two triangles are similar if

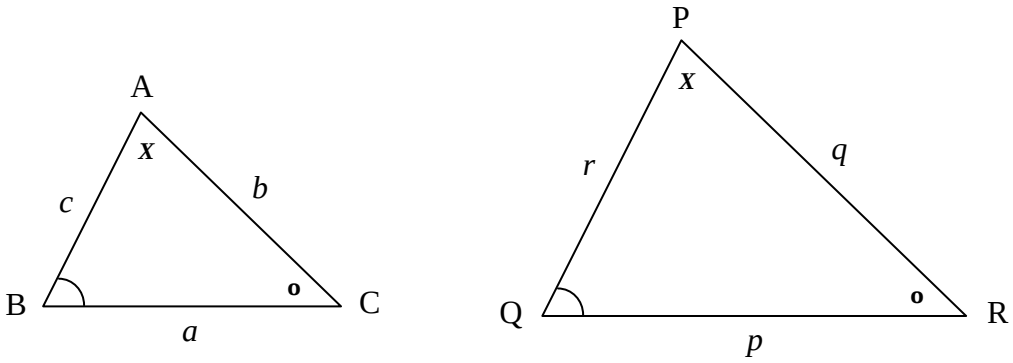
(i) the corresponding angles are equal

and

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

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

Δ**ABC** ~ Δ**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, $\frac{AB}{PQ} = \frac{AC}{PR} = \frac{BC}{QR}$ or $\frac{c}{r} = \frac{b}{q} = \frac{q}{p}$

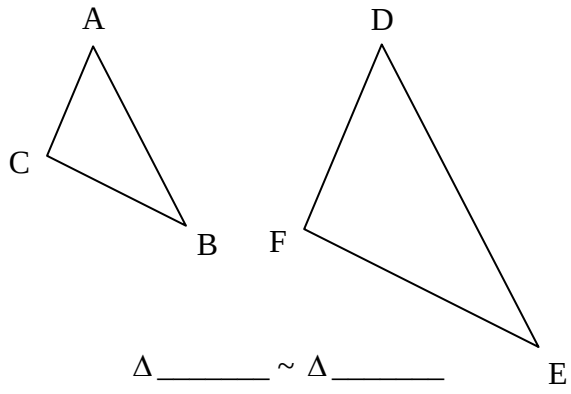
Remember that the corresponding sides are **proportional** in length, but not the same in length.

Similar triangle properties:
Complete each statement about the given pair of similar triangles.

$\frac{AB}{DE} = \frac{AC}{?}$

$\frac{BC}{EF} = \frac{?}{DF}$

$\frac{AC}{DF} = \frac{AB}{?}$



Δ_____ ~ Δ_____

$\angle A = \angle ?$

$\angle B = \angle ?$

$\angle F = \angle ?$

Assigned Work: WS 6-1; Text: p. 333 #4-9, #14-15

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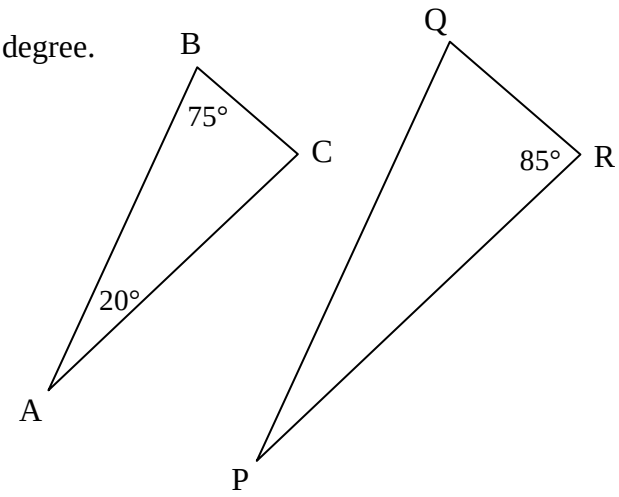
Example 1: Find the missing angles using similar triangle properties.

Given: $\Delta ABC \sim \Delta PQR$.

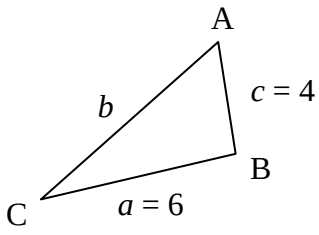
Find the measures of $\angle C$, $\angle P$, and $\angle Q$, to the nearest degree.

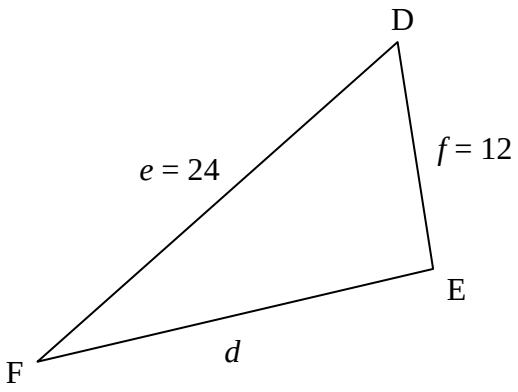


Example 2: Find the missing sides using similar triangle properties.

Given $\Delta ABC \sim \Delta DEF$.

Find the length of sides *b* and *d*. **The measures are in centimetres**.



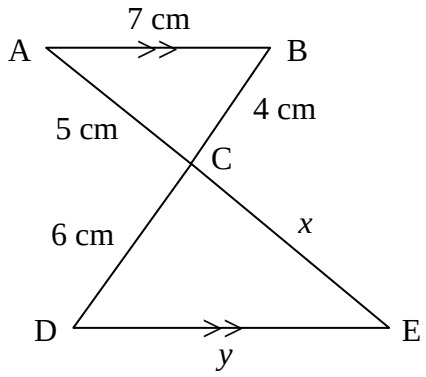


How do you know that two triangles are similar when only the angle measures of the two triangles are given?

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

Example 3: Showing and Using Similarity

(a) Show why ΔABC is similar to ΔEDC.



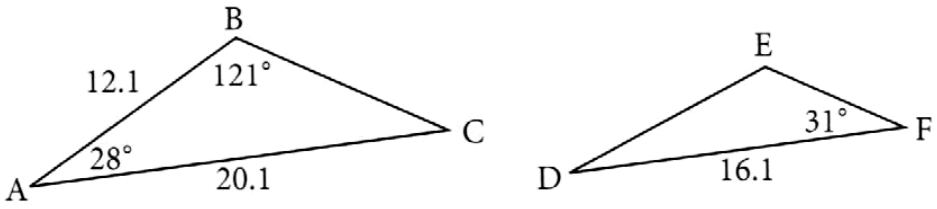
(b) Find the lengths x and y.

Answers: **Ex.1.** $\angle C = 85°$, $\angle P = 20°$, $\angle Q = 75°$**;** **Ex.2.** $b = 8\,\text{cm}$, $d = 18\,\text{cm}$**;**
Ex.3. (a) $\angle A = \angle E$ (alternate angles), $\angle B = \angle D$ (alternate angles), $\angle ACB = \angle ECD$ (opposite angles),
(b) $x = 7.5\,\text{cm}$, $y = 10.5\,\text{cm}$**.**

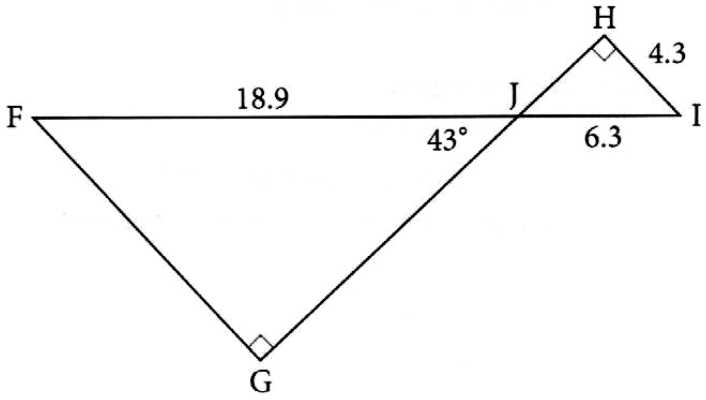
Practice:

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

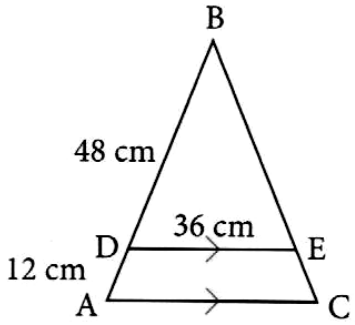
2. Given $\Delta ABC \sim \Delta DEF$, find the measure of $\angle C$ and the length of DE to the nearest tenth of a unit.



3. 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.***



4. In the diagram, DE is parallel to AC. Find the length of AC.
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.



Answers: **2.** $\angle C = 31°$, $DE = 9.7$ **; 3.** $\angle FJG = \angle IJH$ (Alternate Angles), $\angle G = \angle H$, $\angle F = \angle I$ (Interior Angle Sum), $\Delta FJG \sim \Delta IJH$, $FG = 12.9$ **; 4.** $\angle B = \angle B$ (Common), $\angle A = \angle D$ (Corresponding Angles), $\angle C = \angle E$, $\Delta ABC \sim \Delta DBE$, $AC = 45$ cm