Labelling Non-Right Triangles
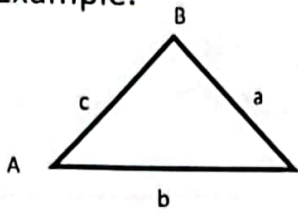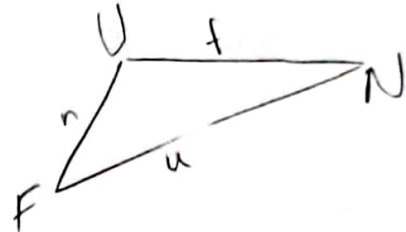- Angles are denoted by capital letters
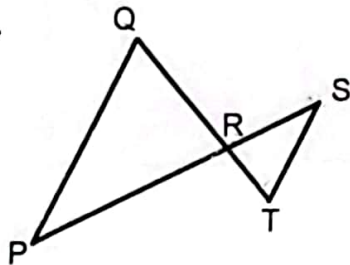- Sides are denoted by lowercase letters
  - side 'a' is opposite angle A
  - the smallest angle is opposite the smallest side
  - the largest angle is opposite the longest side
  - the sum of the 2 smaller sides must be greater than the 3rd side

Example:

1. Draw triangle FUN. Label the sides and angles.

2.

$\triangle RST \sim \triangle RPQ$

$\angle PQR = \angle \underline{STR}$

$\angle \underline{QPR} = \angle TSR$

$\angle PRQ = \angle \underline{SRT}$

$\dfrac{PQ}{ST} = \dfrac{?}{RS}$ RP

$\dfrac{TR}{QR} = \dfrac{TS}{?}$ QP

$\dfrac{RQ}{?} = \dfrac{PR}{SR}$ RT

1.2 Similar Triangles

When 2 triangles are similar, we say that ΔABC ~ΔDEF.
The order of the letters means that:

< A = $<D$

< B = $<E$ and

< C = $<F$

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

Ex. 1 Complete the statements about the pair of similar triangles.

a)
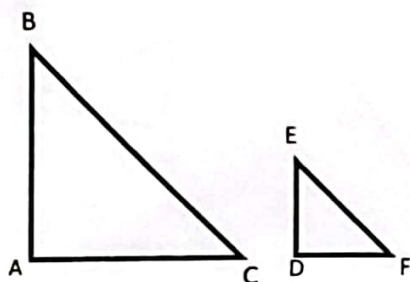
ΔABC ~ ΔDEF

<A = < D

<__ = < E

<C = < __

☆

These are

CORRESPONDING
ANGLES

big Δ ⟶ $\dfrac{AB}{?}$ = $\dfrac{BC}{EF}$ ⟵ big Δ ☆   DE
small Δ ⟶

big Δ ⟶ $\dfrac{?}{EF}$ = $\dfrac{AC}{DF}$ ⟵ big Δ   BC
small Δ ⟶

big Δ ⟶ $\dfrac{AB}{DE}$ = $\dfrac{AC}{?}$ ⟵ big Δ   DF
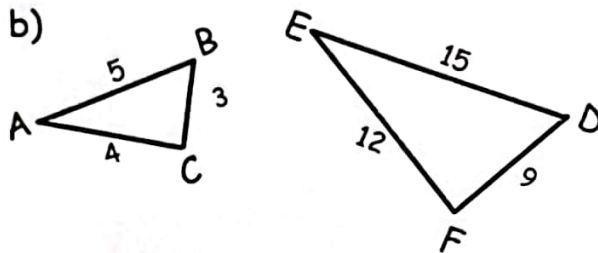small Δ ⟶

Two triangles are similar if:
- the corresponding angles are equal.
- the lengths of the corresponding sides are proportional.

Ex. 2 Determine if the following pairs of triangles are similar.

a)
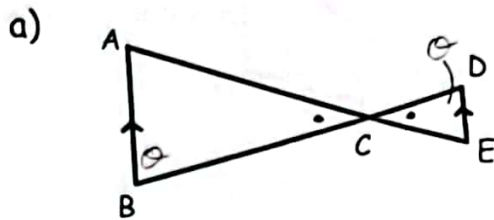
$\angle DCE = \angle BCA$ (O.A.T.)

$\angle CDE = \angle CBA$ (Z-pattern)
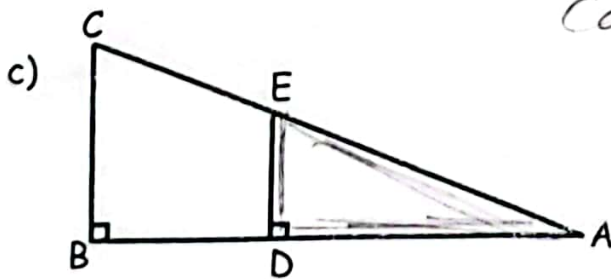
$\therefore \triangle ABC \sim \triangle EDC$

b)

Are the sides proportional?

$\dfrac{\overline{CB}}{\overline{FD}} = \dfrac{3}{9}$

$= \dfrac{1}{3}$

$\dfrac{\overline{AC}}{\overline{EF}} = \dfrac{4}{12}$

$= \dfrac{1}{3}$

$\dfrac{\overline{AC}}{\overline{ED}} = \dfrac{5}{15}$

$= \dfrac{1}{3}$

All the same ratio

$\therefore \triangle ABC \sim \triangle EDF$

c)

Can we confirm angles are the same?
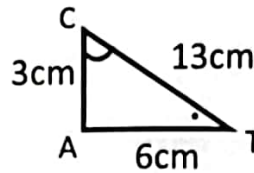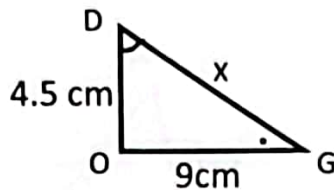
$\angle A = \angle A$

$\angle B = \angle D$

$\angle C = \angle E$ (F-pattern)

$\therefore \triangle CBA \sim \triangle EDA$

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Ex. 3 Prove that the following triangles are similar. Determine the unknowns.

a)

Need angles the same, or proportional sides...

Prove $\angle D = \angle C$ $\therefore \triangle DOG \sim \triangle CAT$
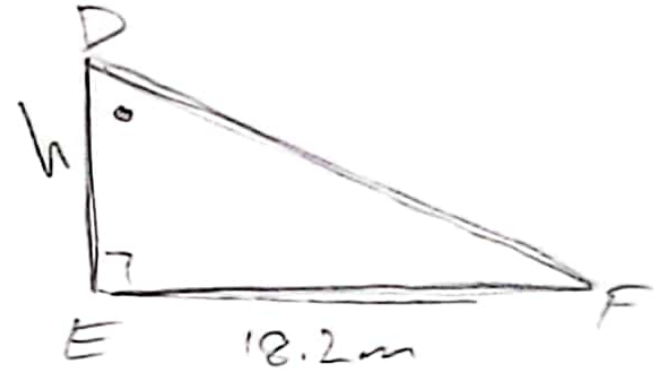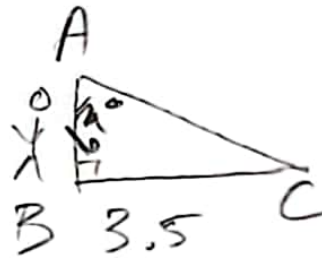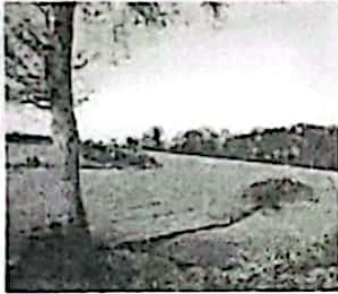 $\angle G = \angle T$

Solve

$$\frac{\overline{DG}}{\overline{CT}} = \frac{\overline{DO}}{\overline{CA}}$$

$$\frac{x}{13} = \frac{4.5}{3}$$

$$\therefore x = 19.5 cm$$

$$x = (13)\frac{4.5}{3}$$

$$= 19.5$$

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CamScanner

4) On a sunny day, Tanner who is 1.7 m tall and standing by a tree, casts a shadow which is 3.5 m long. The nearby tree casts a shadow of 18.2 m long. How tall is the tree?

$\angle A = \angle D$

$\angle B = \angle E$

$\triangle ABC \sim \triangle DEF$

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

$$\frac{h}{1.7} = \frac{18.2}{3.5}$$

$$h = 1.7 \cdot \frac{18.2}{3.5}$$

$$= 8.84$$

∴ The tree is approx 8.8m tall

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