

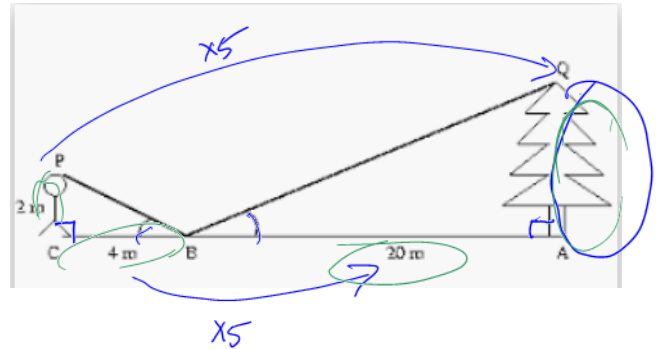
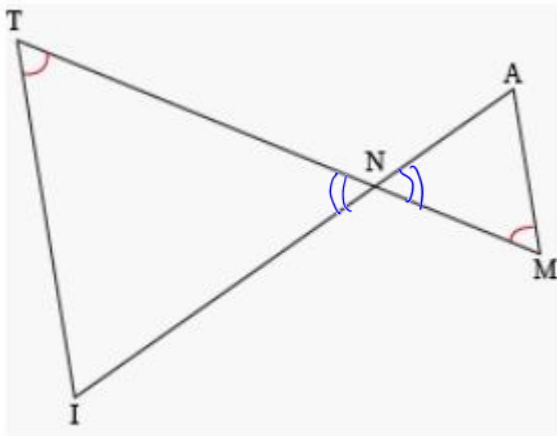
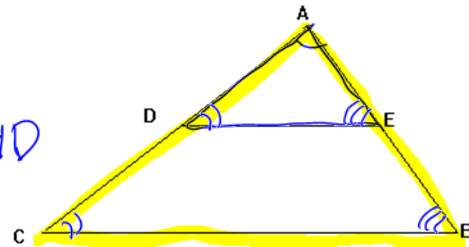
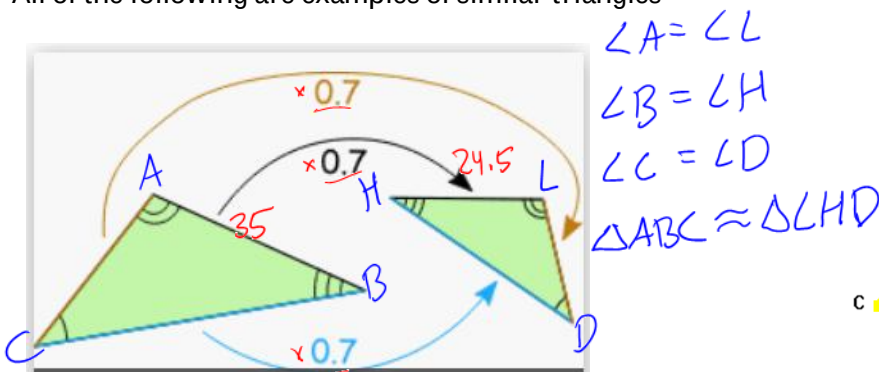
5.1: Similar Triangles

Learning Goal: We are learning the properties of similar triangles.

Two triangles are “**similar**” if they meet two conditions:

- All of their corresponding angles must be identical
 - You only need to check that two are identical. Why?
 - Be careful to consider that the triangles might be rotated!
- All three of the pairs of sides must be in proportion
 - “In proportion” means that there is some common factor that you can multiply one side length by to get another.

All of the following are examples of similar triangles



To solve for the height, you must set up a **proportion**

Make sure that what you are trying to find is in the numerator!

Solve for the missing value by Cross multiplying

$$\frac{x}{4} = \frac{2}{20} \quad \times$$

$$\frac{x}{20} = \frac{2}{4} \quad \checkmark$$

What is the height of the tree? 10m

$$\frac{\text{big side}}{\text{small side}} = \frac{\text{big side}}{\text{small side}}$$

$$\frac{20}{4} = \frac{x}{2} \quad \times 2$$

$$10m = x$$

$\triangle \angle$

$\triangle ABC \approx \triangle DEF$

Example 1: On the triangles to the right....

List all three pairs of corresponding angles.

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

What is the size of angle D?

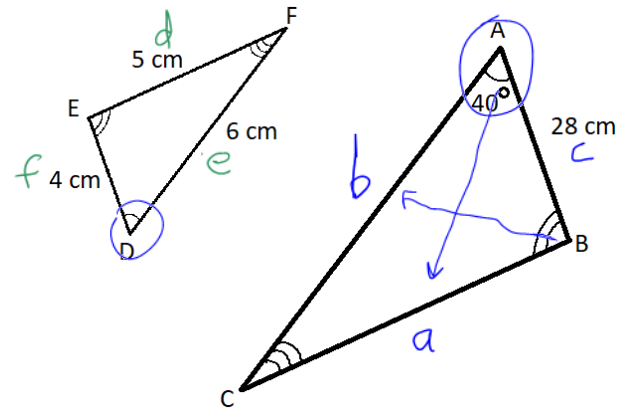
40°

What is the length of side b?

big $\rightarrow$ small $\rightarrow$ $\frac{28}{4} = \frac{b}{6}$ (x6)
 $b \times 28 = 4 \times 6$
 $b = 42 \text{ cm}$

What is the length of side a?

big $\rightarrow$ small $\rightarrow$ $\frac{a}{5} = \frac{28}{4}$
 $a = \frac{5 \times 28}{4}$
 $a = 35 \text{ cm}$



Example 2:

How do you know the triangles to the right are similar?

All 3 angles are identical. Both share $\angle A$
 $\angle E = \angle B$
 $\angle D = \angle C$

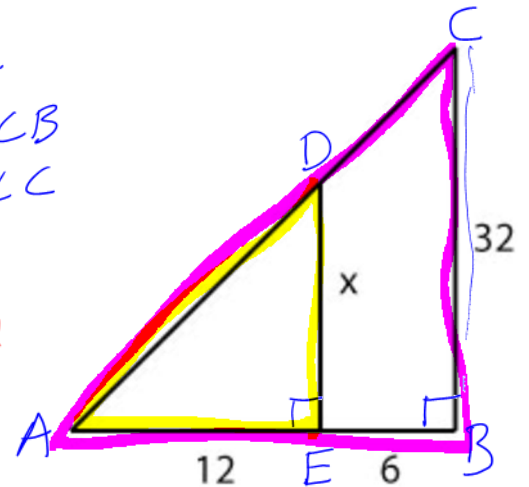
What scale factor exists between the two triangles?

Compare AE to AB
 $AE \times \text{Scale Factor} = AB$
"SF" = $\frac{AB}{AE}$ big small
 $= \frac{18}{12}$

What is the size of side x?

small $\rightarrow$ big $\rightarrow$ $\frac{x}{32} = \frac{12}{18}$
 $x = \frac{32 \times 12}{18}$
 $x = 21.\bar{3}$

SF = 1.5



Success Criteria

- I can test if two triangles are similar by
 - Seeing if their angles are identical
 - Checking that all three sides are proportional
- I can solve for an unknown side length in two similar triangles
- I can solve for an unknown angle in two similar triangles