Name: _____   Date: _____
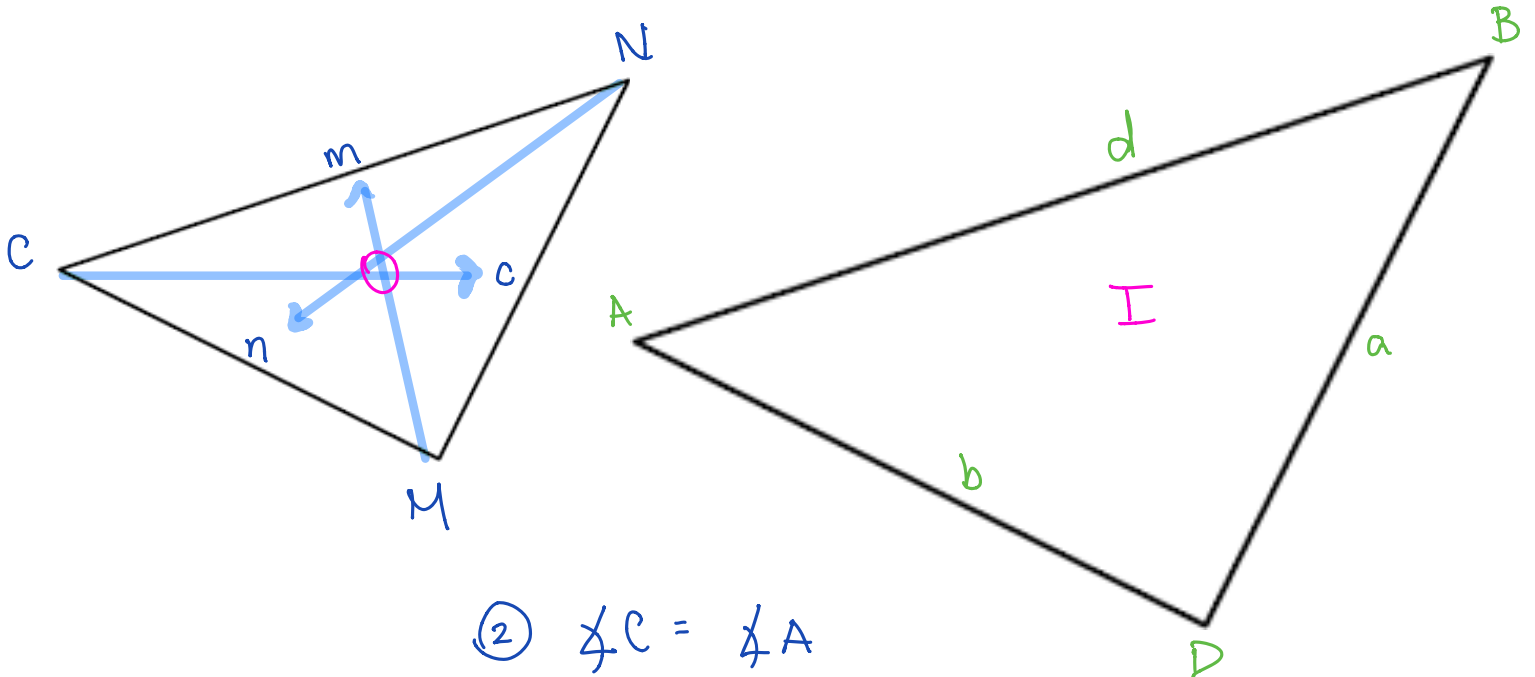
Learning Goal 7.3	I can solve problems involving similar polygons and triangles.

Recall the criteria for polygons to be considered **similar**:

1. The scale factor needs to be the same for all edges
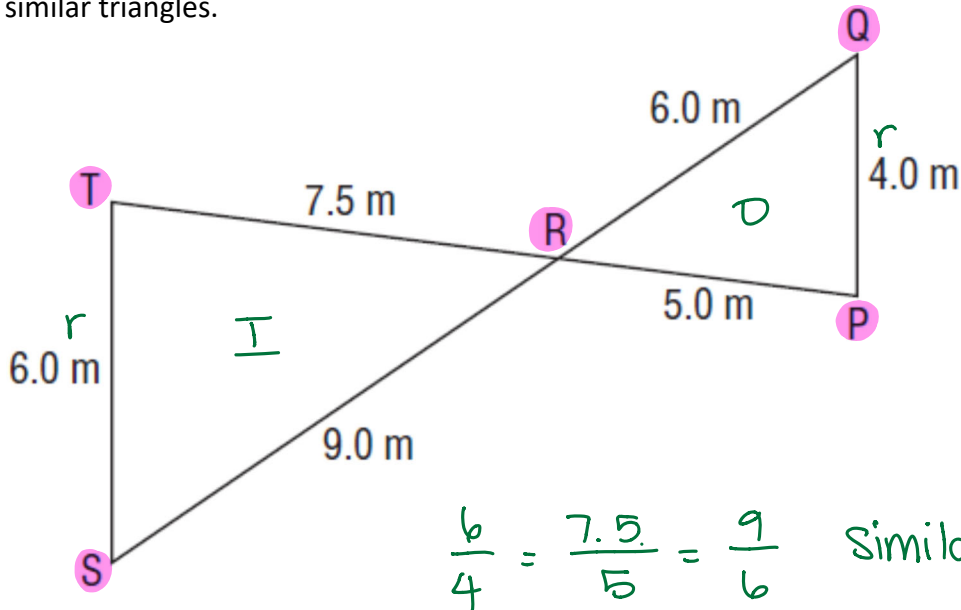2. The angles are always going to be the same.

① Scale factor $= \dfrac{d}{m} = \dfrac{a}{c} = \dfrac{b}{n}$ similar SSS (side-side-side)

② $\angle C = \angle A$
$\angle D = \angle M$ similar AAA
$\angle N = \angle B$ (angle-angle-angle)

Similar by SAS (side-angle-side)
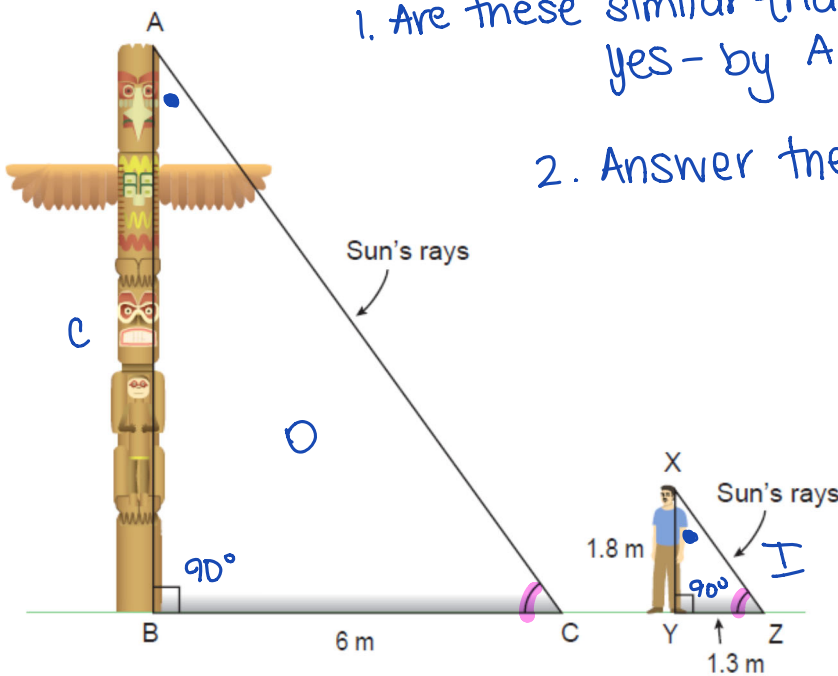
Example Identify similar triangles.

$$\frac{6}{4} = \frac{7.5}{5} = \frac{9}{6} \quad \text{Similar by SSS.}$$

$$A + B = 180$$
$$-(C + B = 180)$$
$$\overline{}$$
$$A - C = 0$$
$$A = C$$

Pay VERY close attention to order! → $\triangle PQR \sim \triangle TSR$

↑ similar

Example At a certain time of day, a person who is 1.8 metres tall has a shadow 1.3 metres long. At the same time, the shadow of a totem pole is 6 metres long. The sun's rays interest the ground at equal angles. How tall is the totem pole, to the nearest tenth of a metre?

1. Are these similar triangles.?
   yes - by AAA

2. Answer the question!

$$\frac{1.3}{6} \times = \frac{1.8}{C}$$

$$\frac{1.3C}{1.3} = \frac{10.8}{1.3}$$

$$C = 8.307$$
$$\doteq 8.3 \, m$$

The totem pole is 8.3m tall.

Example A surveyor wants to determine the width of a lake at two points on opposite sides of the lake. She measures distances and angle on land, then sketches this diagram. How can the surveyor determine the length of HN to the nearest metre?
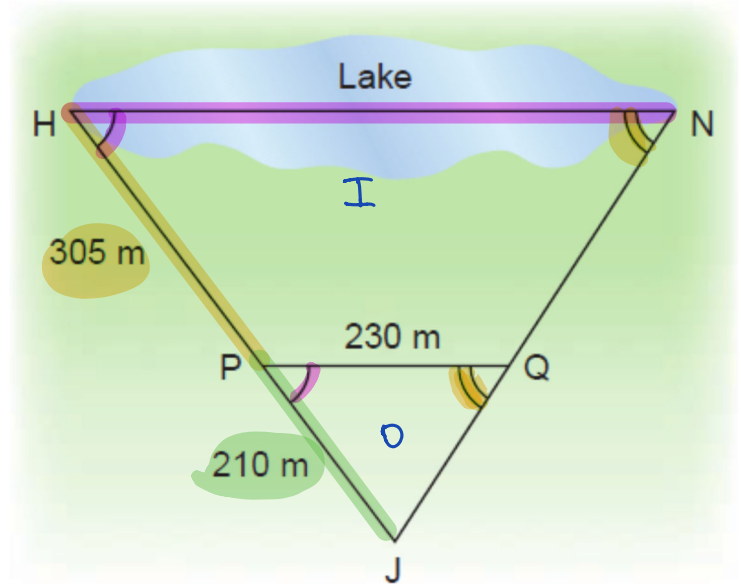
1. Are they similar triangles?
    yes by AAA

$$\frac{HN}{230} \ne \frac{515}{210}$$

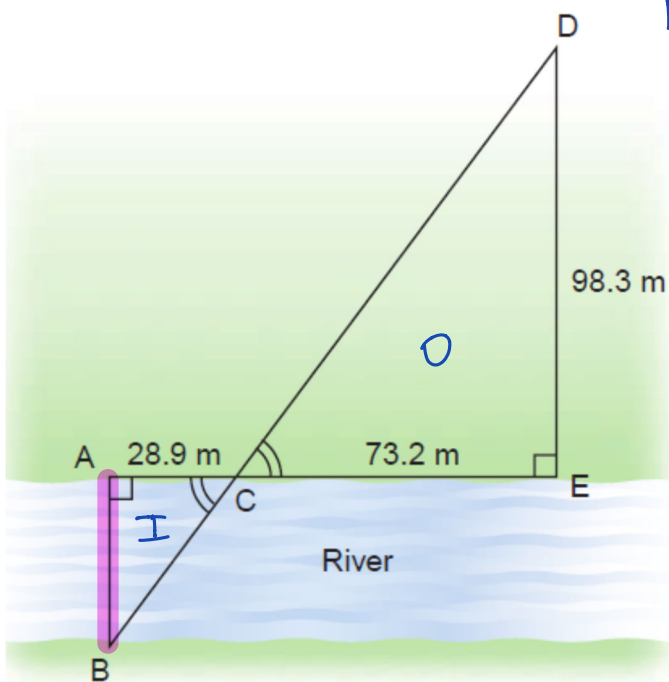$$\frac{210\,HN}{210} = \frac{118450}{210}$$

$$HN = 564.05$$

The lake is 564 m long.

Now, she uses this scale diagram to determine the width of the river running into the lake. The measurements she made and equal angles are shown. What is the width, AB, to the nearest tenth of a metre?

1. Are the triangles similar?
    yes by AAA

2.
$$\frac{28.9}{73.2} \ne \frac{AB}{98.3}$$

$$\frac{2840.87}{73.2} = \frac{73.2\,AB}{73.2}$$

$$38.80 = AB$$

The river is 38.8 m wide.