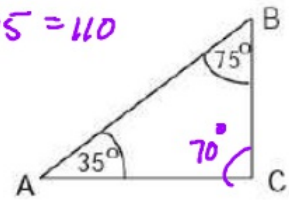
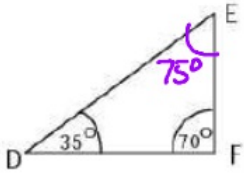
Math 3
Similarity and Congruence Review

Name _____

1. State whether or not the following triangles are similar and support your answer.

35+75 = 110

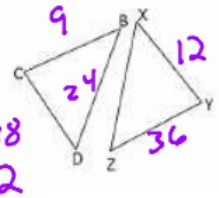




35+70 = 105

Yes

2. In the figure given to the left, ΔXYZ is similar to ΔBCD.



BC=9
XY=12
BD=24
ZY=36

a. Find the value of XZ.

$\frac{BC}{XY} = \frac{BD}{XZ}$

$\frac{9}{12} = \frac{24}{x}$

$9x = 288$

$x = 32$

$XZ = 32$

b. Find the value of CD

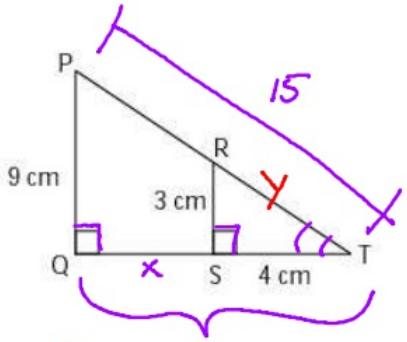
$\frac{BC}{XY} = \frac{CD}{YZ}$

$\frac{9}{12} = \frac{x}{36}$

$12x = 324$

$x = 27$

3. Looking at the triangles in the figure on the right:
   a) Are the two triangles similar? Yes by AA
   b) What is the length of *QT*?
   c) If *PT* is 15 cm, what is the length of *RT*?



b) $\frac{3}{9} = \frac{4}{QT}$

$3QT = 36$

$QT = 12$

c) $\frac{3}{9} = \frac{y}{15}$

$9y = 45$

$y = 5$

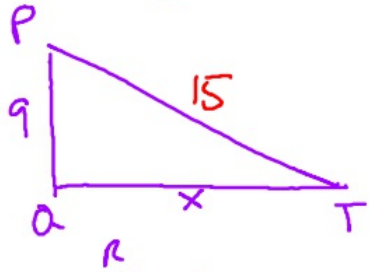
$\frac{3}{9} = \frac{4}{x+4}$

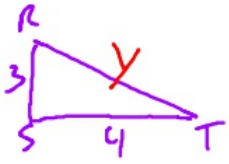
$3x + 12 = 36$

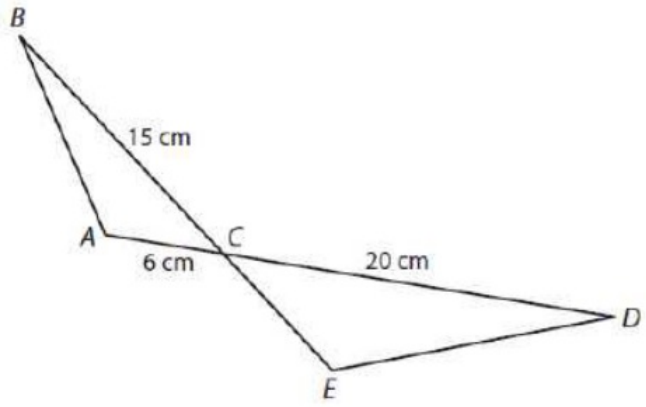
$3x = 24$

$x = 8$

$8 + 4 = 12 = QT$







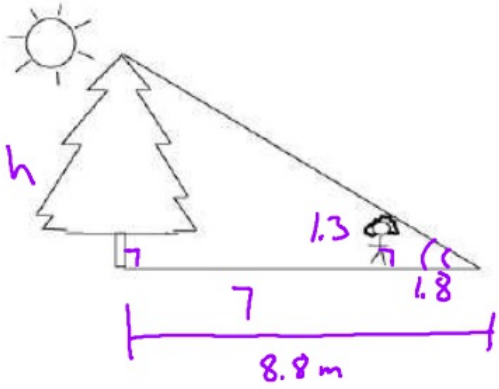
4. In the diagram to the left, $\triangle ACB \sim \triangle ECD$. Find the length of $\overline{CE}$.

$$\frac{15}{20} = \frac{6}{x}$$

$$15x = 120$$

$$x = 8$$

5. Tonya is 1.3 meters tall. She stands 7 meters in front of a tree and casts a shadow 1.8 meters long. How tall is the tree?

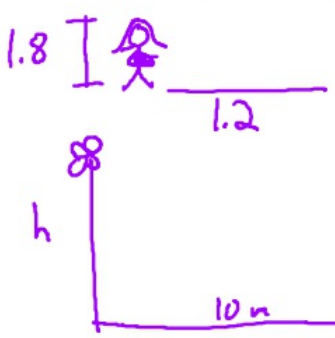


$$\frac{1.3}{1.8} = \frac{h}{8.8}$$

$$1.8h = 11.44$$

$$h = 6.36 \text{ m}$$

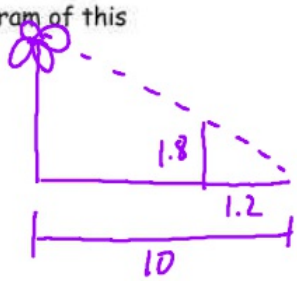
6. Stephanie casts a shadow of 1.2 m and she is 1.8 m tall. A wind turbine casts a shadow of 10 m at the same time that Stephanie measured her shadow. Draw a diagram of this situation and then calculate how tall the wind turbine is.



$$\frac{1.8}{1.2} = \frac{h}{10}$$

$$1.2h = 18$$

$$h = 15 \text{ m}$$



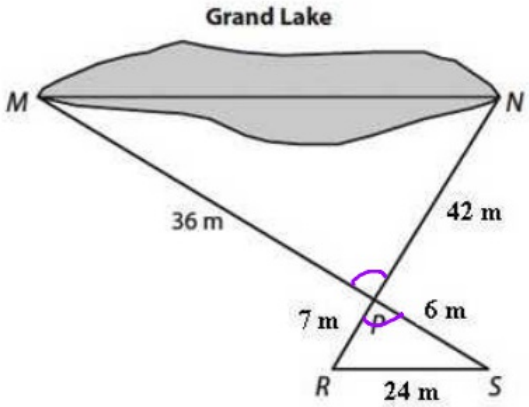
7. Maya needed to determine the longest distance across Grand Lake. She made the measurements as shown in the diagram.

a. Provide an argument to justify that $\triangle NPM \sim \triangle RPS$.

We know vertical ∠'s are ≅.

$\frac{6}{36} = \frac{7}{42}$ Yes $\triangle NPM \sim \triangle RPS$

$\frac{1}{6} = \frac{1}{6}$ by SAS

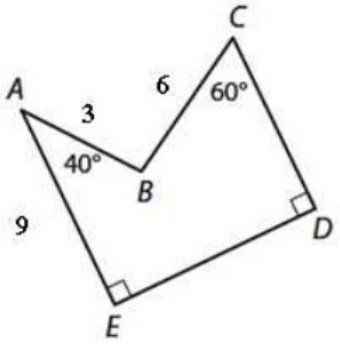


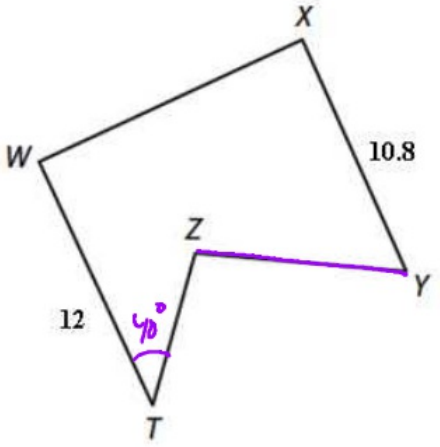
b. Determine *MN*, the longest distance across Grand Lake.

$\frac{6}{36} = \frac{24}{x}$ $x = 144$ m

$6x = 864$ $MN = 144$ m

8. In the diagrams below, *pentagon ABCDE ~ pentagon TZYXW*.





a. Use the information provided to determine each measure.

i. $m\angle T =$ 40°

$\frac{AE}{WT} = \frac{BC}{YZ}$ $\frac{9}{12} = \frac{6}{x}$

$9x = 72$

$x = 8$

ii. $ZY =$ 8

$\frac{AE}{WT} = \frac{CD}{YX}$ $\frac{9}{12} = \frac{x}{10.8}$

$12x = 97.2$

$x = 8.1$

iii. $CD =$ 8.1

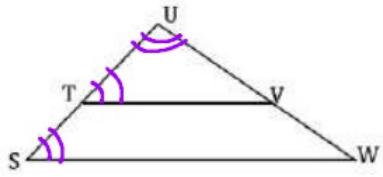
b. What is the scale factor from pentagram *TZYXW* to pentagram *ABCDE*? Explain your reasoning.

$k = \frac{9}{12} = \frac{3}{4}$

$k < 1$ because figure is getting smaller

SSS
SAS
AA

9. Given: $\angle S \cong \angle UTV$



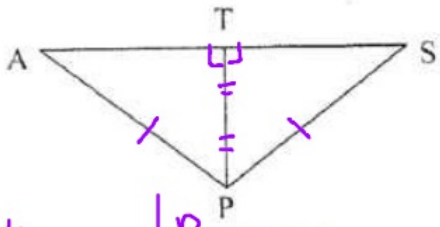
Prove: $\Delta SUW \sim \Delta TUV$

Statement	Reason
1) $\angle S \cong \angle UTV$	1) Given
2) $\angle U \cong \angle U$	2) Reflexive prop
3) $\Delta SUW \sim \Delta TUV$	3) AA

10.

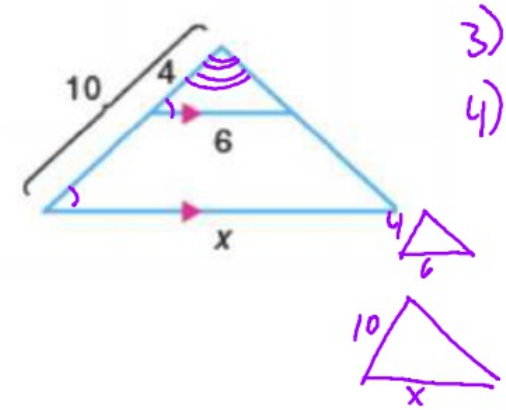
Given: $\overline{TP} \perp \overline{AS}$, $\overline{AP} \cong \overline{SP}$

Prove: $\Delta ATP \cong \Delta STP$



Statement	Reason
1) $\overline{TP} \perp \overline{AS}$, $\overline{AP} \cong \overline{SP}$	1) Given
2) $\angle ATP$ and $\angle STP$ are Rt $\angle$'s	2) Def of $\perp$ Lines
3) $\overline{TP} \cong \overline{PT}$	3) Reflexive prop
4) $\Delta ATP \cong \Delta STP$	4) HL

11. Solve for x.

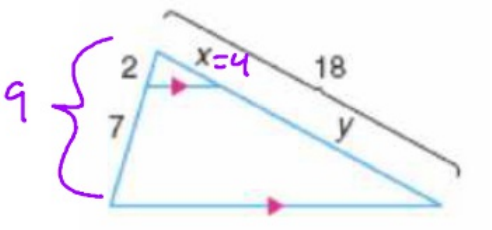


$\frac{4}{6} = \frac{10}{x}$

$4x = 60$

$x = 15$

12. Solve for x and y.



$\frac{2}{9} = \frac{x}{18}$

$9x = 36$

$x = 4$

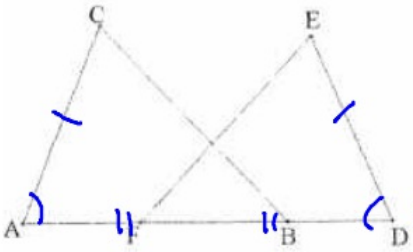
$x + y = 18$

$4 + y = 18$

$y = 14$

13. Given: $\overline{AC} \cong \overline{DE}$; $\overline{AB} \cong \overline{DF}$; $\angle CAB \cong \angle EDF$

Prove: $\overline{CB} \cong \overline{EF}$



Statement	Reason
1) $\overline{AC} \cong \overline{DE}$, $\overline{AB} \cong \overline{DF}$, $\angle CAB \cong \angle EDF$	1) Given
2) $\triangle CAB \cong \triangle EDF$	2) SAS
3) $\overline{CB} \cong \overline{EF}$	3) CPCTC