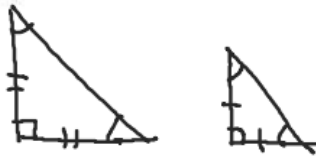5. Based on their work in Problem 4, several students at Black River High School made conjectures about families of polygons. Each student tried to outdo the previous student. For each claim, explain as precisley as you can why it is true or give a counterexample to show why it is false.
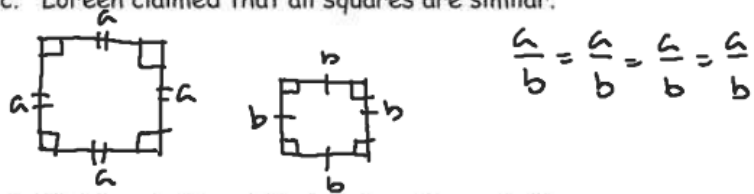
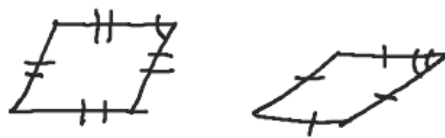a. Monisha conjectured that all isosceles right triangles are similar.

b. Ahmed conjectured that all equilateral tirangles are similar.

$$\frac{a}{b} = \frac{a}{b} = \frac{a}{b}$$
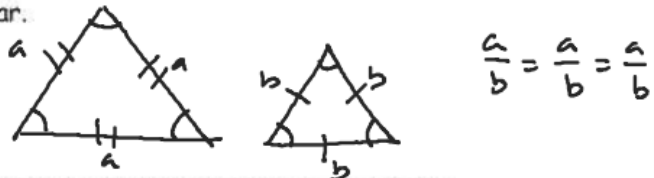
c. Loreen claimed that all squares are similar.

$$\frac{a}{b} = \frac{a}{b} = \frac{a}{b} = \frac{a}{b}$$

d. Jeff conjectured that all rhombi are similar.
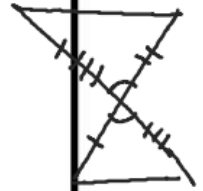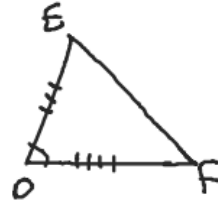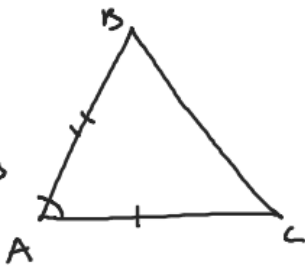

e. Amy claimed that all regular Hexagons are similar.
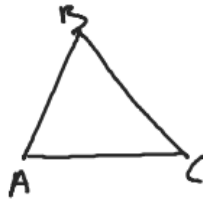
Ways to prove Triangles Similar

Side-Angle-Side (SAS)

2 pairs of corresponding Sides in the same Ratio and included angles $\cong$.

Side-Side-Side (SSS)

3 pairs of corresponding Sides in the same Ratio

Angle-Angle (AA)

2 pairs of Corresponding $\angle$'s $\cong$

Proving Triangles Similar
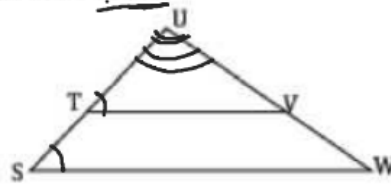
Reflexive prop
Something is $\cong$ to itself.

$$\frac{AB}{DE} = \frac{AC}{DF} \; ; \; \angle A \cong \angle D$$

$$\frac{AB}{XY} = \frac{BC}{YZ} = \frac{AC}{XZ}$$

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

Prove: $\triangle SUW \sim \triangle TUV$

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

7.

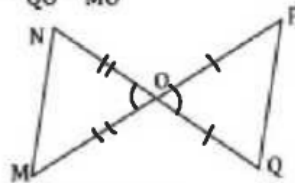Given: $\overline{AB} \parallel \overline{DC}$, $\angle ACB \cong \angle E$
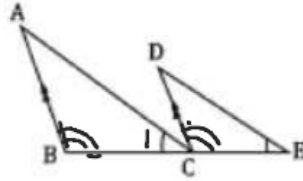
Prove: $\triangle ABC \sim \triangle DCE$

Statement	Reason
1) $\overline{AB} \parallel \overline{DC}$, $\angle ACB \cong \angle E$	1) Given
2) $\angle ABC \cong \angle DCE$	2) Corresponding $\angle$'s
3) $\triangle ABC \sim \triangle DCE$	3) AA

8.

Given: $\dfrac{NO}{QO} = \dfrac{PO}{MO}$


Prove: $\triangle MNO \sim \triangle PQO$

Statement	Reason
1) $\dfrac{NO}{QO} = \dfrac{PO}{MO}$	1) Given
2) $\angle MON \cong \angle QOP$	2) Vertical $\angle$'s
3) $\triangle MNO \sim \triangle PQO$	3) SAS

Using Similarity to Find Measure	Suppose a mirror is placed on the ground as shown. You position yourself to see the top of the sculpture reflected in the mirror. An important property of physics states that in such a case, the angle of incidence is congruent to the angle of reflection.

$6'5'' = 77''$

$116'8'' = 1400''$
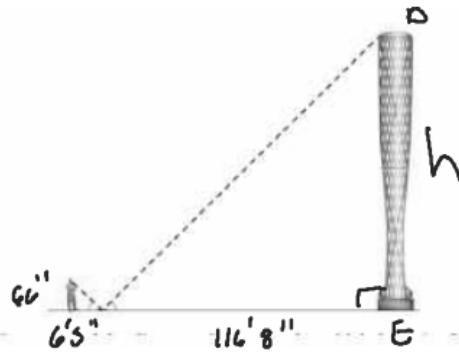
9. Prove that the two triangles are similar. $\triangle ABM \sim \triangle DEM$

| Statement	Reason
1) $\angle AMB \cong \angle DME$	1) Given
2) $\angle B \cong \angle E$	2) All Rt $\angle$'s $\cong$.
3) $\triangle ABM \sim \triangle DEM$	3) AA

10. Add to your diagram the following measurements.
   - The ground distance between you and the mirror image of the top of the column is 6 feet 5 inches.
   - The ground distance between the mirror image and the base of the column is 116 feet 8 inches.
   - Assume that the distance from the ground up to your eyes is 66 inches.

About how tall is the column?

$$\frac{66}{h} = \frac{77}{1400}$$

$$77h = 92400$$
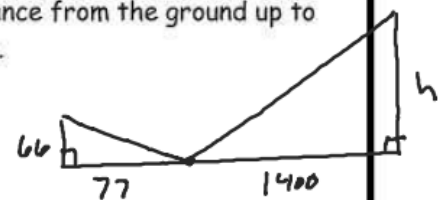
$$h = 1200''$$

$$h = 100'$$

11. As part of their annual October outing to study the changing colors of trees in northern Maine, several scinece club members from Pland Regional High School decided to test what they were learning in their math class by finding the width of the Penobscot River at a particular point A as shown below.

Pacing from point A, they located points D, E, and C as shown in the diagram below.
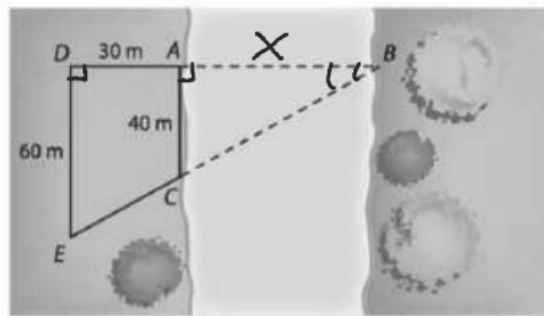
What is your estimate of the width of the river at point A?

20

45

60