Math 1312
Section 5.2
Similar Polygons

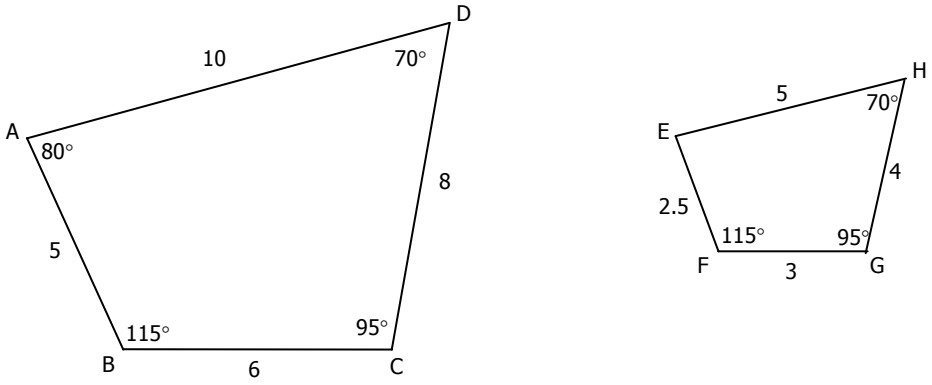
Definition:
Two polygons are **similar** (~) if and only if two conditions are satisfied:

1. All pairs of corresponding angles are congruent.
2. The ratios of the measures of corresponding sides are equal.

The symbol "~" means "similar to"

Definition:
Scale Factor (constant of proportionality) is the ratio of the lengths of two corresponding sides of two similar polygons.

Example 1:
The following quadrilaterals are similar:



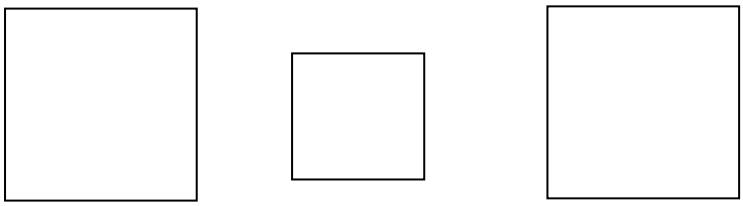
Why are they similar? Because……..

1) $\angle A \cong \angle E \quad \angle B \cong \angle F \quad \angle C \cong \angle G \quad \angle D \cong \angle H$

2) $\frac{AB}{EF} = \frac{BC}{FG} = \frac{CD}{GH} = \frac{DA}{HE} = \frac{2}{1}$ ← This is the scale factor.

Similar figures have the **same shape** but not necessarily the same size.

Example 2:
Which figures are similar?



Two congruent polygons are also similar.

Question:
Two similar polygons are always congruent, true or false?

Example 3:
Which figures must be similar?

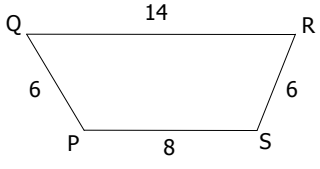
a. Any two isosceles triangles

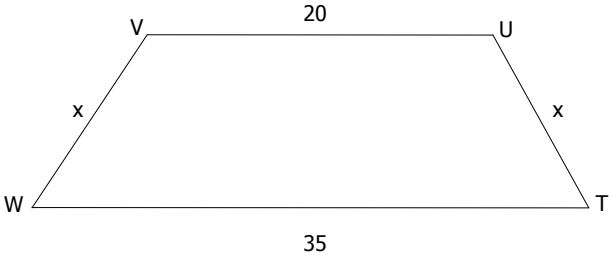
b. Any two regular pentagons

c. Any two rectangles

d. Any two squares

Example 4:
Trapezoid PQRS is similar to trapezoid UTWV. Find the value of x.





a. identify the scale factor

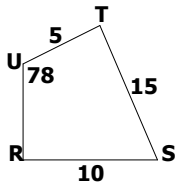
b. set up a proportion (make sure to put ratios of the proportions in the same order)

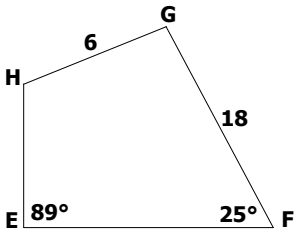
c. cross multiply

d. solve

Example 5:

Complete each statement - RSTU ~ EFGH





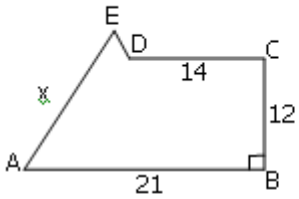
1. ∠R = _____ 2. ∠S = _____

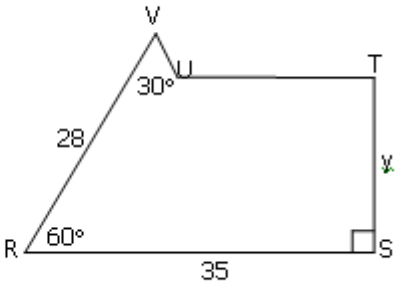
3. ∠H = _____ 4. ∠G = _____

5. $\frac{HG}{UT}$ = _____ 6. $\frac{ST}{FG}$ = _____

Example 6:
Complete each statement - ABCDE~RSTUV

1. The scale factor of ABCDE to RSTUV is _____.





2. m∠E = _____ 3. m∠A = _____

4. m ∠B = _____

5. x = _____

6. y = _____

7. UT = _____

8. UV = 20, DE = _____

Example 7:

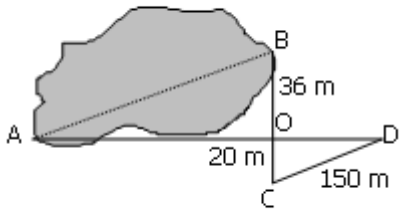
$\Delta ABC \sim \Delta DEF$. The scale factor of ΔABC to ΔDEF is $\frac{3}{7}$. Draw a picture and then complete each statement.

1. If AB=15, then DE=_____

2. If EF=42, then BC=_____

3. If DF=56, then AC=_____

Example 8:
In order to find the distance AB across a lake, a surveyor constructed ΔOCD similar to ΔOBA. He measured OB (36m), OC (20m), and CD (150m) directly to obtain the lengths shown. Find the length of AB.



Example 9:
ΔRST ~ ΔRUV find x and y