

## Flashcards: Similar Polygons

**Directions: Answer the following questions.**

1. All angles in the first polygon are congruent to the corresponding angles in the second polygon. Are the polygons similar? The first polygon has side lengths 8, 10, 10 and 15. The second polygon has side lengths 12, 15, 15 and 22.5.
2. If quadrilateral A has angle measures  $35^\circ$ ,  $95^\circ$ ,  $69^\circ$ , and  $161^\circ$ , and quadrilateral B has angle measures  $35^\circ$ ,  $95^\circ$ ,  $69^\circ$ , and  $161^\circ$  are the two quadrilaterals similar?
3. The regular pentagons below are similar. If the ratio of the sides of the larger pentagon to the sides of the smaller pentagon is 5:1, what is the value of  $x$ ? What are the lengths of the sides of each pentagon? The first pentagon has side lengths  $2x$  plus 7 and the second pentagon has side lengths  $x$  minus 1.
4. If the angles in quadrilateral ABCD are measure of angle A equals 49 degrees, measure of angle B equals 100 degrees, measure of angle C equals  $5x$  minus 3 degrees, and measure of angle D equals  $y$  degrees, and the angles in quadrilateral HIJK are measure of angle H equals 49 degrees, measure of angle I equals 100 degrees, measure of angle J equals  $2x$  plus 12 degrees, and measure of angle K equals  $y$  degrees, find the value of  $x$  and  $y$  which would make the quadrilaterals similar. Find the measures of the missing angles.

Answers:

1. We are already told that the corresponding angles are congruent. Compare the ratios of all the sides.  $8$  divided by  $12$  equals  $0.667$ ,  $10$  divided by  $15$  equals  $0.667$ ,  $10$  divided by  $15$  equals  $0.667$  and  $15$  divided by  $22.5$  equals  $0.667$ .  
The ratios of all pairs of corresponding sides are equal to  $0.667$ , therefore the figures are similar.
2. Not necessarily. In order for polygons to be similar, the angles must be congruent, but the side lengths must also be proportional.
3. Since the pentagons are regular, all sides in each pentagon are congruent. The ratio is 5:1.  
 $5$  over  $1$  equals the quantity  $2x$  plus  $7$  over the quantity  $x$  minus  $1$ .  $5$  times the quantity  $x$  minus  $1$  equals  $1$  times the quantity  $2x$  plus  $7$ .  $5x$  minus  $5$  equals  $2x$  plus  $7$ .  $5x$  equals  $2x$  plus  $12$ .  $3x$  equals  $12$ .  $x$  equals  $4$ .  
Sides of larger:  
 $2$  times  $4$  plus  $7$  equals  $15$  inches.  
Sides of smaller:  
 $4$  minus  $1$  equals  $3$  inches.
4. Corresponding angles are congruent.  
 $5x$  minus  $3$  equals  $2x$  plus  $12$ .  $5x$  equals  $2x$  plus  $15$ .  $3x$  equals  $15$ .  $x$  equals  $5$   
The measure of angle C equals the measure of angle J equals  $5$  times  $5$  minus  $3$  equals  $22$  degrees.  
The measure of angle D equals the measure of angle K equals  $360$  minus  $49$  minus  $100$  minus  $22$  equals  $189$  degrees.  $Y$  equals  $189$  degrees.