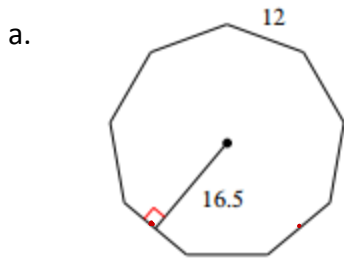


8.3 Area of Regular Polygons Homework
Geometry 3313

Name key

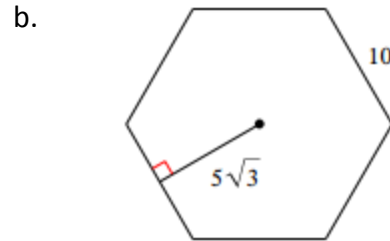
1. Find the area of each of the regular polygons below.



$$P = 12(9) = 108$$

$$A = \frac{1}{2}(108)(16.5)$$

$$A = 891 \text{ u}^2$$

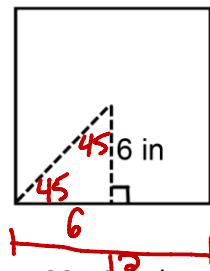


$$P = 10(6) = 60$$

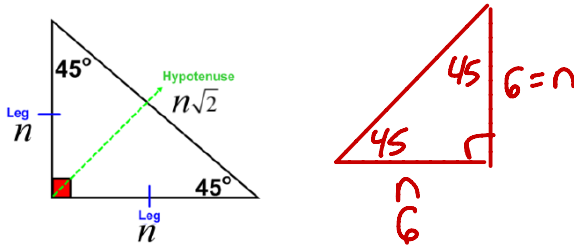
$$A = \frac{1}{2}(60)(5\sqrt{3})$$

$$A = 150\sqrt{3} \text{ u}^2 \text{ OR } 259.8 \text{ u}^2$$

2. The apothem of the square below is 6 inches. Because the right angle of the square is bisected by the line, this creates a 45-45-90 triangle.



a. Use the 45-45-90 triangle pattern to find the length of the bottom side of the triangle. Then find the side length of the square.



b. Use the formula for a square to find the area of the square.

$$A = 12^2$$

$$A = 144 \text{ in}^2$$

c. Use the regular polygon formula to find the area of the square.

$$P = 12(4)$$

$$P = 48$$

$$A = \frac{1}{2}(48)(6)$$

$$A = 144 \text{ in}^2$$

3. Suppose the area of a regular pentagon is 130.8 cm^2 and the apothem is 6 cm. Find the side length of the pentagon.

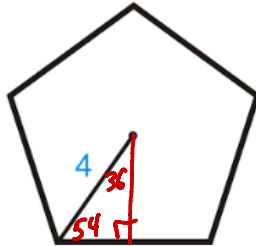
$$130.8 = \frac{1}{2}P(6)$$

$$130.8 = 3P$$

$$43.6 = P$$

$$\frac{43.6}{5} = \boxed{8.72 \text{ cm}}$$

4. Suppose we have the regular pentagon below.



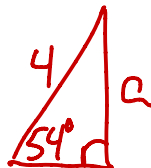
- a. Use the interior angle of a regular polygon formula, Each Interior Angle = $\frac{(n-2)180^\circ}{n}$, to find the measure of each interior angle of the regular pentagon.

$$\frac{(5-2) \cdot 180}{5} = 108$$

- b. Draw in the apothem of the regular pentagon to form a triangle. What are the angle measurements of the triangle?

$$36^\circ - 54^\circ - 90^\circ$$


- c. Use SOHCAHTOA to find the length of the apothem.



$$\sin 54 = \frac{a}{4}$$

$$4 \sin 54 = a \rightarrow a = 3.2$$

- d. Use SOHCAHTOA to find the side length.



$$\cos 54 = \frac{x}{4}$$

$$4 \cos 54 = x \rightarrow 2.4 \quad \text{side} = 2(2.4)$$

$$= 4.8$$

- e. Find the area of the regular ~~hexagon~~ ^{pentagon} above.

$$P = 5(4.8) \quad A = \frac{1}{2}(24)(3.2)$$

$$P = 24 \quad \boxed{A = 38.4 \text{ u}^2}$$