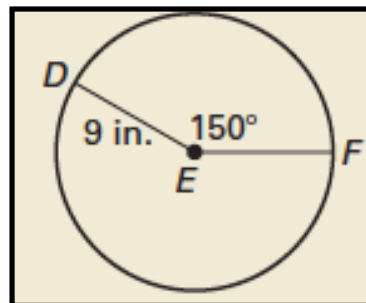


**Bellwork**  
**04/20/12**

1. Find the area of the sectors formed by  $\triangle DEF$ .



$$= \frac{150}{360} \cdot \frac{81\pi}{1}$$

$$\begin{aligned} \text{Ans.} &= \frac{135\pi}{4} \text{ in}^2 \\ &= 106.03 \text{ in}^2 \end{aligned}$$

**Geometry**  
**11.6 Areas of Regular Polygons**  
**Standard(s): 2, 4**

**Vocabulary:**

Center of a Polygon: The center of the circumscribed circle.

Radius of a Polygon: Radius of the circumscribed circle.

Apothem of a Polygon: The distance from the center to any side of the polygon.

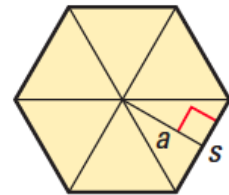
Central Angle of a Regular Polygon: An angle formed by two radii drawn to consecutive vertices of the polygon.

$$\frac{360^\circ}{s}$$

**THEOREM***For Your Notebook***THEOREM 11.11 Area of a Regular Polygon**

The area of a regular  $n$ -gon with side length  $s$  is one half the product of the apothem  $a$  and the perimeter  $P$ ,

so  $A = \frac{1}{2}aP$ , or  $A = \frac{1}{2}a \cdot ns$ .



$$A = \frac{1}{2} a P$$

Missing Segment:  
 1. Special rt.  $\Delta$ 's  
 2. Pyth. Thm.  
 3. Trig Ratios

## Find the Central $\angle$

Find the measure of a central angle of a regular polygon with the given number of sides. Round answers to the nearest tenth of a degree, if necessary.

**40 Sides**

$$\frac{360}{40} = 9^\circ$$

**21 Sides**

$$\frac{360}{21} = 17.1^\circ$$

Find the given angle measure for the regular hexagon shown.

**$m\angle EGD$**

$$\frac{360}{6} = 60^\circ$$

**$m\angle FGD$**

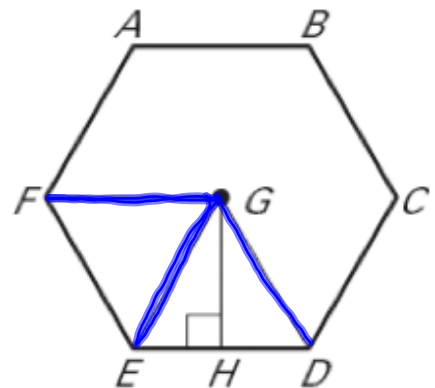
$$60 \cdot 2 = 120^\circ$$

**$m\angle GHD$**

$$90^\circ$$

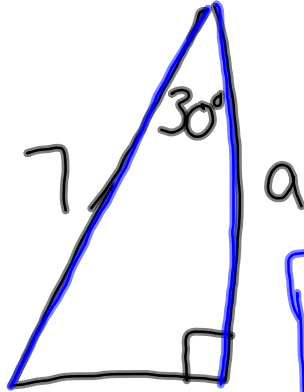
**$m\angle EGH$**

$$\frac{60}{2} = 30^\circ$$

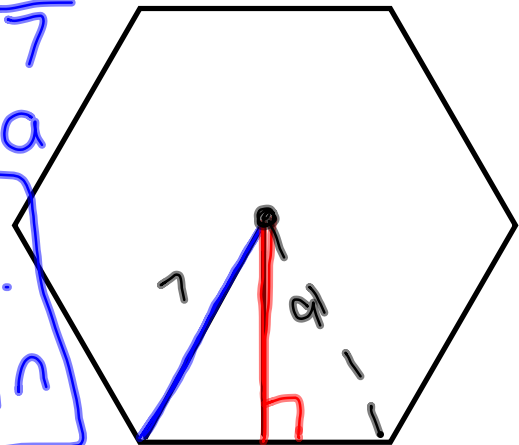


## Find the Apothem

What is the length of the apothem of a regular hexagon with radius 7 in.? Round the answer to the nearest tenth.

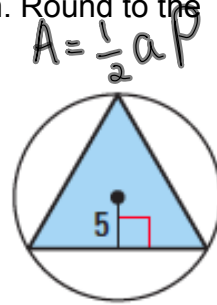
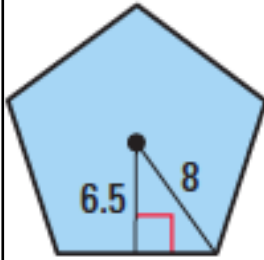


$$\cos 30 = \frac{a}{7}$$
$$7 \cdot \cos 30 = a$$
$$a = \frac{7\sqrt{3}}{2} \text{ in.}$$
$$a = 6.06 \text{ in}$$



## Find the Area

Find the perimeter and the area of the polygon. Round to the nearest tenth, if necessary.



$$8^2 = s^2 + 6.5^2$$

$$s = \frac{\sqrt{87}}{2} = 4.66$$

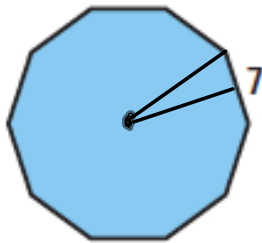
$$s = \sqrt{87} = 9.33$$

$$P = 9.33 \cdot 5$$

$$\star P = 5\sqrt{87} = 46.64$$

$$A = \frac{1}{2}(6.5)(5\sqrt{87})$$

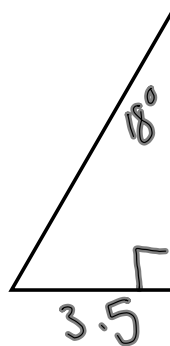
$$\star A = 151.57 \text{ in}^2$$



$$P = 7(10) = 70$$

$$\frac{360}{10} = 36$$

$$\frac{36}{2} = 18$$



$$\tan 18 = \frac{3.5}{a}$$

$$a = \frac{3.5}{\tan 18}$$

$$a = 10.77$$

$$A = \frac{1}{2}(10.77)(70)$$

$$A = 377.02 \text{ in}^2$$

## Area of Shaded Regions

Find the area of the shaded region.

$$\frac{360}{8} = 45$$

$$\frac{45}{2} = 22.5$$

$$\tan 22.5 = \frac{6}{a}$$

$$a = \frac{6}{\tan 22.5} = 14.49$$

$$\sin 22.5 = \frac{6}{r}$$

$$r = \frac{6}{\sin 22.5} = 15.68$$

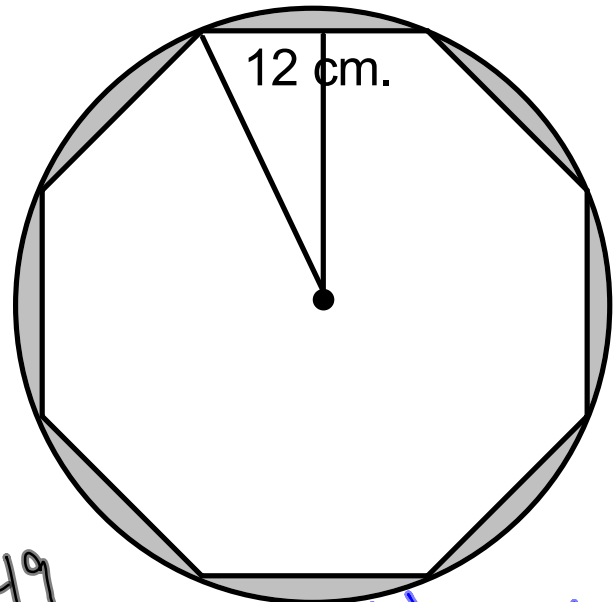
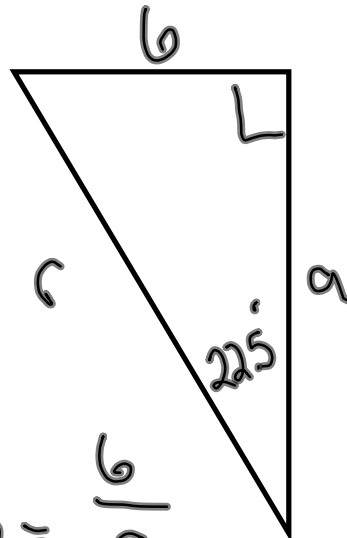
$$A_c = (15.68)^2 \pi$$

$$A_c = 772.28$$

$$A_o = \frac{1}{2}(14.49)(96)$$

$$A_o = 695.52$$

$$A = 76.76 \text{ cm}^2$$



$$P = 12(8) = 96$$

## **Homework Assignment**

**Pg. 765-766  
#8-16, 19-21, 27-30**

