

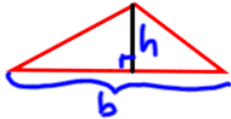
Area of Regular Polygons

(Section 11.5)

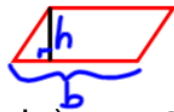
I CAN... Determine the apothem of a regular polygon
Calculate the area of a regular polygon

Index Cards

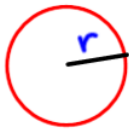
$$A(\text{triangle}) = \frac{1}{2}bh$$



$$A(\text{parallelogram}) = bh$$



$$A(\text{circle}) = \pi r^2$$



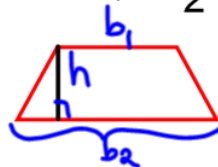
$$A(\text{rectangle}) = lw$$



$$A(\text{square}) = s^2$$

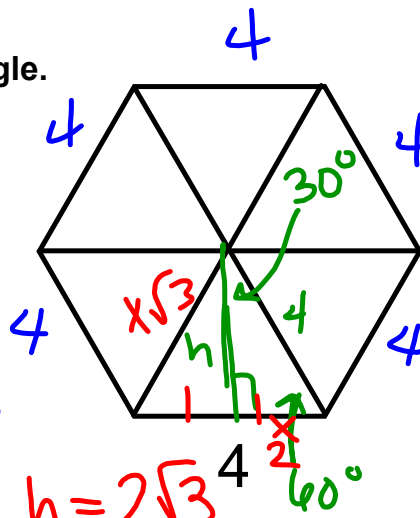


$$A(\text{trapezoid}) = \frac{1}{2}h(b_1 + b_2)$$



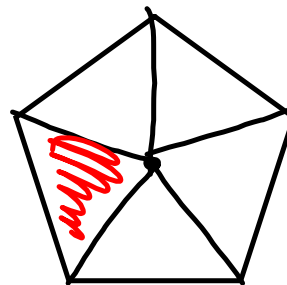
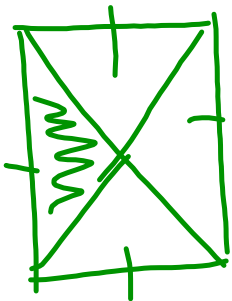
1) Find the area of the shaded triangle.

2) Find the area of the hexagon.



Regular \rightarrow all sides \cong

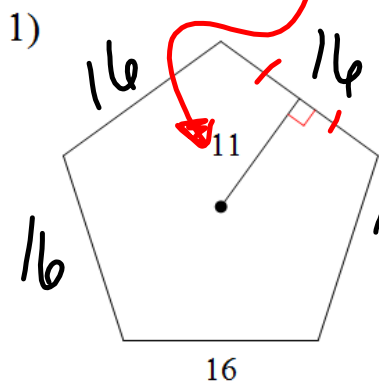
$$A = \frac{1}{2}(4)(2\sqrt{3})$$



To find the Area of a REGULAR polygon:

$$A = \frac{1}{2}ap$$

Where a is the apothem
and p is the perimeter



$$A = \frac{1}{2}(111)(16.5)$$

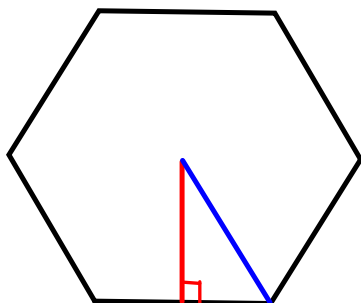
$$A = 440 \text{ in}^2$$

Index Card!!!

Definitions

apothem - a segment in a regular polygon from the center perpendicular to a side

radius - a segment joining the center to any vertex



Index Card!!!

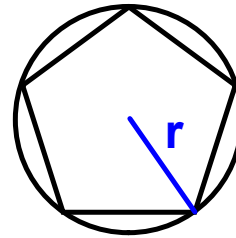
Important Observations

- Only **REGULAR POLYGONS** have apothems.
- An apothem is the **PERPENDICULAR BISECTOR** of a side.
- All apothems of a regular polygon are **CONGRUENT**.
- A radius a a regular polygon **BISECTS** an angle of the polygon.

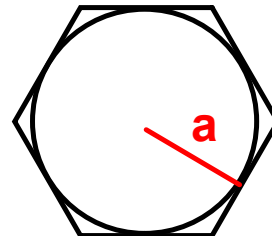
Index Card!!!

Important Observations continued...

- A radius of a regular polygon is a radius of a circle circumscribed ABOUT the polygon.



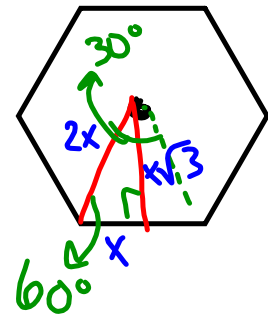
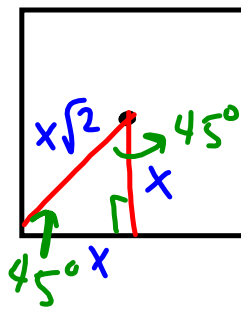
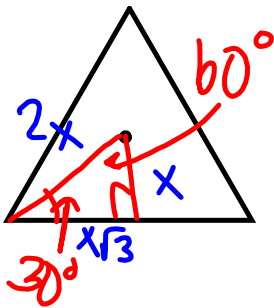
- An apothem is a radius of a circle inscribed in a polygon.



Index Card!!!

Special Regular Polygons

When you draw in an apothem and a radius what do you create in each figure??

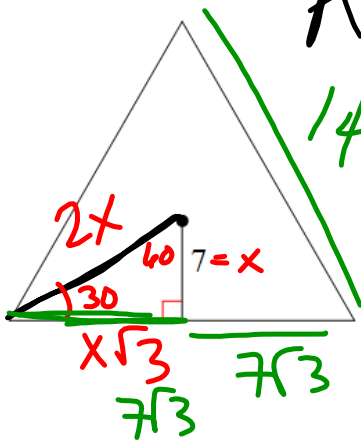


Index Card!!!

Find the area of each regular polygon.

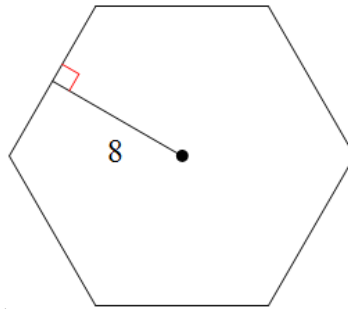
Given the apothem...

2)



$$A = \frac{1}{2} aP$$

3)



$$14\sqrt{3}$$

$$A = \frac{1}{2} (7)(42\sqrt{3})$$

$$A = 147\sqrt{3}$$

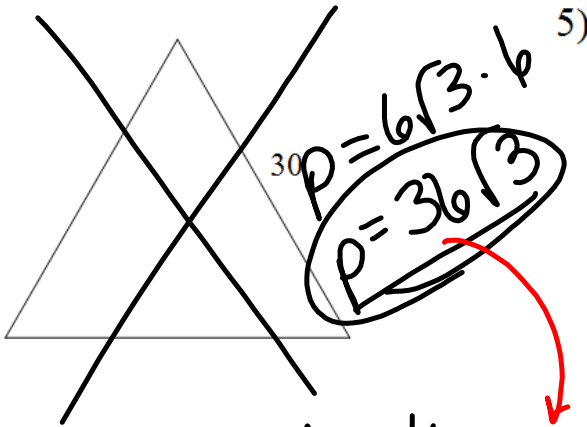
$$P = 7\sqrt{3} \cdot 6 \text{ or } 14\sqrt{3} \cdot 3$$

$$= 42\sqrt{3}$$

Find the area of each regular polygon.

Given a side...

4)

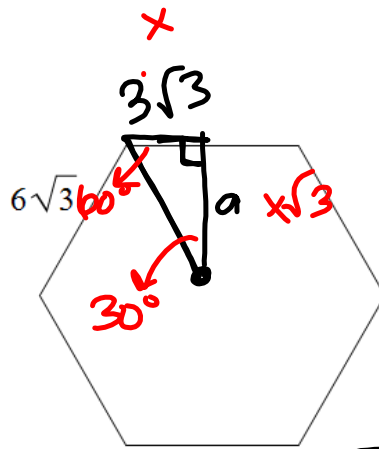


$$A = \frac{1}{2} a p$$

$$A = \frac{1}{2} (36\sqrt{3})(9)$$

$$A = 162\sqrt{3}$$

5)



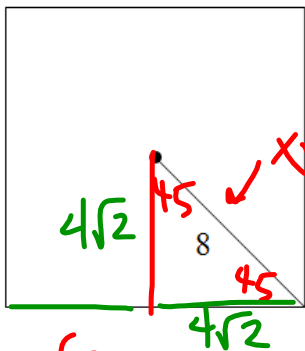
$$a = 2\sqrt{3} \cdot \sqrt{3} \rightarrow 3 \cdot 3$$

$$a = 9$$

Find the area of each regular polygon.

Given the radius...

6)



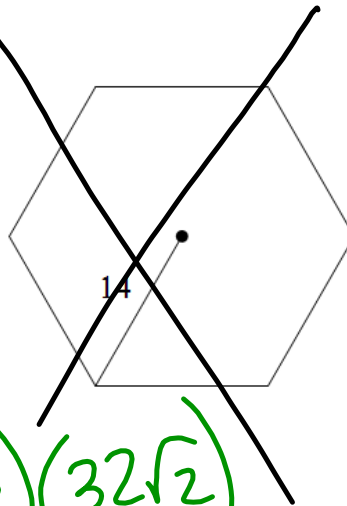
$$8 = x\sqrt{2}$$

$$x = \frac{8\sqrt{2}}{2} \rightarrow 4\sqrt{2}$$

$$4\sqrt{2} \cdot 8$$

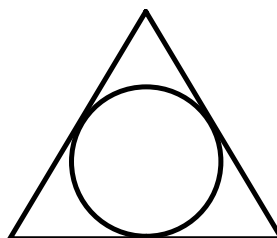
$$\begin{aligned} A &= \frac{1}{2}(4\sqrt{2})(32\sqrt{2}) \\ &= 64\sqrt{2} \cdot \sqrt{2} \\ &= 128 \end{aligned}$$

7)

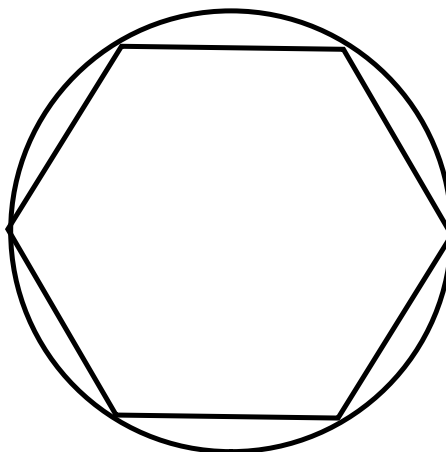


Inscribed and Circumscribed Circles

- 8) Find the area of an equilateral triangle if the radius of the inscribed circle is 6.



- 9) A circle of radius 10 is circumscribed about a regular hexagon. Find the area of the hexagon.



HOMework

p. 533 #2a, 3a, 4a, 5 - 7, 9 - 11, 15

