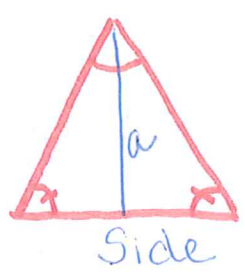
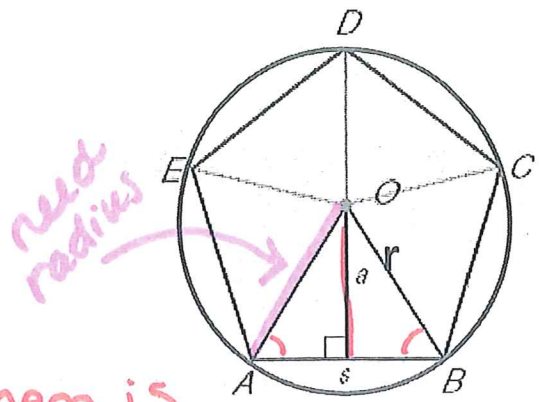
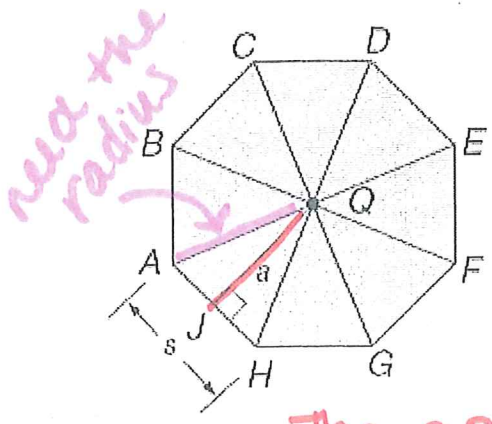


Name: Key Date: _____

Area of Regular Polygons- Given an Apothem NOTES

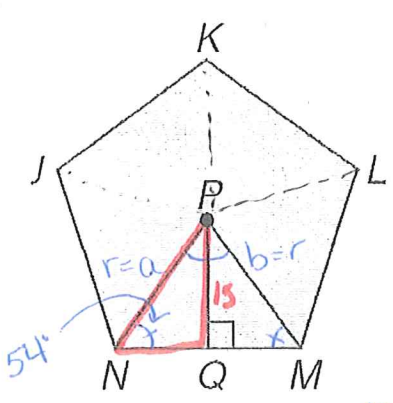
Finding the area of regular polygons Notes



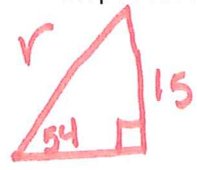
The apothem is like the height of the Δ . It connects the center to the midpt of a side. ALL ISOSCELES Δ s!! Bases are \cong

Examples:

1. If PQ=15in



Step 1. Find Radius



$$\sin 54 = \frac{15}{r}$$

$$r = 18.5 \text{ in}$$

Step 2: $A = n(1/2absin\theta)$

$$A = 5 \left(\frac{1}{2} (18.5)(18.5) \sin 72 \right)$$

$$A \approx 813.7 \text{ in}^2$$

$n = 5$
number of Δ
(# of sides)
 $a = b = r$

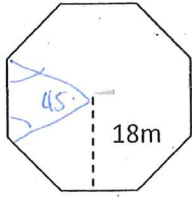
$$\frac{360}{5} = 72$$

$$180 - 72 = 108$$

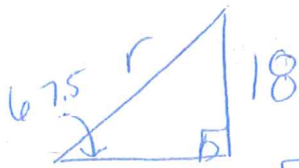
$$\frac{108}{2} = 54$$

Directions: Find the area of the regular polygon. Show all work.

2.



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

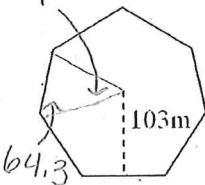


$$\sin(67.5) = \frac{18}{r} \quad r = 19.5$$

$$A = 8 \left(\frac{1}{2} \right) (19.5)(19.5) \sin 45$$

$$A \approx 1075.5 \text{ m}^2$$

3.



$$\frac{360}{7} = 51.4$$



$$\sin 64.3 = \frac{103}{r}$$

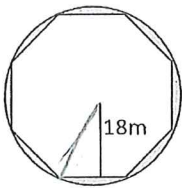
$$r = 114.3$$

$$A = 7 \left(\frac{1}{2} \right) (114.3)^2 \sin 51.4$$

$$A \approx 35735.6 \text{ m}^2$$

Directions: Find the area of the shaded region. Show all work.

4.



Same area as # 2

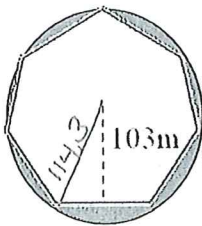
Circle - octagon

$$A = \pi (19.5)^2 - 8 \left(\frac{1}{2} \right) (19.5)(19.5) \sin 45$$

$$r = 19.5 \quad A = 380.25\pi - 1075.5$$

$$A \approx 119.1 \text{ m}^2$$

5.

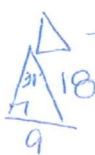


$$A = \pi (114.3)^2 - 7 \left(\frac{1}{2} \right) (114.3)^2 \sin 51.4$$

$$A = 13064.49\pi - 35735.6$$

$$A \approx 5367.7 \text{ m}^2$$

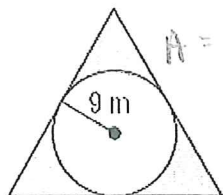
30-60-90



- circle

$r = 18$ for Δ $r = 9$ for circle!

6.



$$A = 3 \left(\frac{1}{2} \right) (18)^2 \sin 120 - \pi 9^2$$

$$A = 420.9 - 81\pi$$

$$A \approx 166.4 \text{ m}^2$$