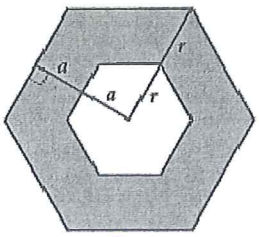
Name: _____

Area of Regular Polygons Homework

Find the area of the shaded figure. Round to the nearest tenth, if necessary.

1. Find the area of the shaded regular hexagonal donut. The apothem and sides of the smaller hexagon are half as long as the apothem and sides of the larger hexagon. a=6.9cm and r=8cm.



r = 16 cm r = 8 cm

A = large hexagon − small hexagon

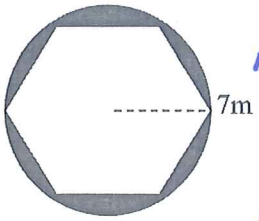
$= 6\left(\frac{1}{2}(16)^2 \sin 60\right) - 6\left(\frac{1}{2}(8)^2 \sin 60\right)$

$= 665.1 - 166.3$

$A \approx 498.8\ cm^2$

$\theta = \frac{360}{6} = 60$

2



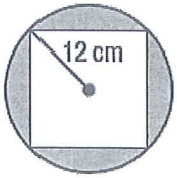
A = ○ − hexagon

$A = \pi 7^2 - 6\left(\frac{1}{2}(7)^2 \sin 60\right)$

$= 49\pi - 127.3$

$A \approx 26.6\ m^2$

3



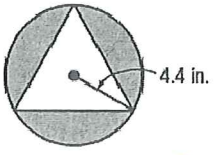
A = ○ − □

$A = \pi 12^2 - 4\left(\frac{1}{2}(12)^2 \sin 90\right)$

$= 144\pi - 288$

$A \approx 164.4\ cm^2$

4.



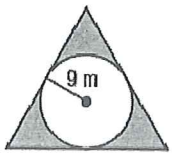
A = ○ − △

$A = \pi 4.4^2 - 3\left(\frac{1}{2}(4.4)^2 \sin 120\right)$

$= 19.4\pi - 25.1$

$A \approx 35.8\ in^2$

5



r = 18 r = 9

A = △ − ○

$\cos 60 = \frac{9}{r}$

$r = 18$

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

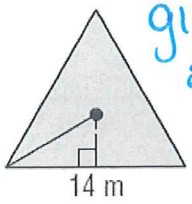
$= 420.9 - 81\pi$

$A \approx 166.4\ m^2$

CCSS:

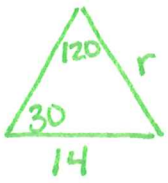
Find the area of each regular polygon. Round to the nearest tenth.

1.



given side

$\theta = \frac{360}{3} = 120$



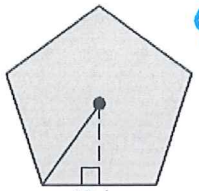
$\frac{\sin 120}{14} = \frac{\sin 30}{r}$

$r = 8.1\text{ m}$

$A = 3\left(\frac{1}{2}(8.1)^2 \sin 120\right)$

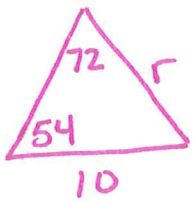
$A \approx 85.2\text{ m}^2$

2.



given side

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



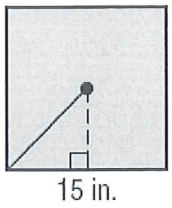
$\frac{\sin 72}{10} = \frac{\sin 54}{r}$

$r = 8.5\text{ in}$

$A = 5\left(\frac{1}{2}(8.5)^2 \sin 72\right)$

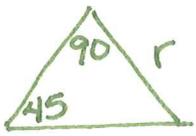
$A \approx 171.8\text{ in}^2$

3.



given side

$\theta = \frac{360}{4} = 90$



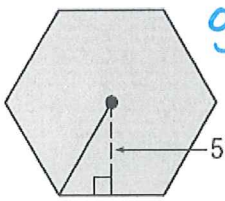
(use special rt △)

$r = 7.5\sqrt{2}\text{ in}$

$A = 4\left(\frac{1}{2}(7.5\sqrt{2})^2 \sin 90\right)$

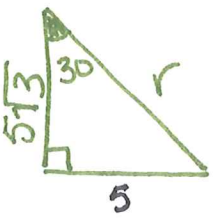
$A \approx 225\text{ in}^2$

4.



given apothem

$\theta = \frac{360}{6} = 60$



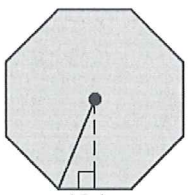
(use special rt △)

$r = 10\text{ cm}$

$A = 6\left(\frac{1}{2}(10)^2 \sin 60\right)$

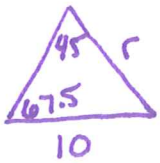
$A \approx 259.8\text{ cm}^2$

5.



given side

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



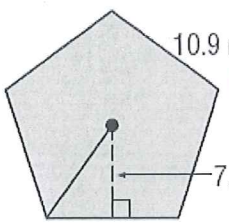
$\frac{\sin 45}{10} = \frac{\sin 67.5}{r}$

$r = 13.1\text{ in}$

$A = 8\left(\frac{1}{2}(13.1)^2 \sin 45\right)$

$A \approx 485.4\text{ in}^2$

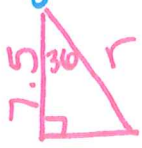
6.



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

$\theta = 72$

given side + apothem



$\cos 36 = \frac{7.5}{r}$

$r = 9.3\text{ m}$

$A = 5\left(\frac{1}{2}(9.3)^2 \sin 72\right)$

$A \approx 205.6\text{ m}^2$