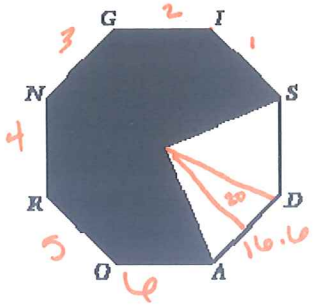
Name: Key

Area of Regular Polygons Homework

Find the area of the shaded figure.

1. Find the area of the shaded region of the regular octagon ROADSIGN. The apothem measures 20 cm. Segment GI=16.6cm. Round to the nearest square centimeter.



$a = 20$

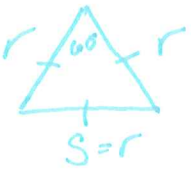
$s = 16.6$

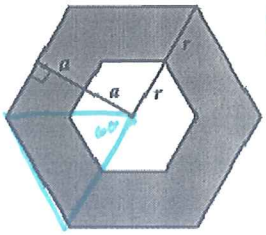
$A = 6\Delta s$

$A = 6 \cdot \frac{1}{2} \cdot 20 \cdot 16.6$

$A = 996\,cm^2$

2. 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.





Big − Little

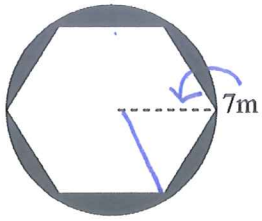
$r = 8 \quad R = 16$

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

$A_S = 6 \cdot \frac{1}{2} \cdot 16 \cdot 16 \sin(60) - 6 \cdot \frac{1}{2} \cdot 8 \cdot 8 \sin(60)$

$A_S \approx 498.8\,cm^2$

3.



$n = 6$

$r = 7 \quad a = 7 \quad b = 7$

$\theta = 60$

$A_S = \text{Circle} - \text{hexagon}$

$A_S = \pi r^2 - n \cdot \frac{1}{2} ab \sin\theta$

$A_S = \pi 7^2 - 6 \cdot \frac{1}{2} \cdot 7 \cdot 7 \sin(60)$

$A_S \approx 26.632$

$A_S \approx 26.6\,m^2$

Find the area of the shaded region, round to the nearest tenth.

4.

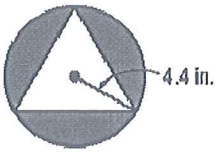
$r = 12\text{ cm}$

$A_S = \pi 12^2 - 4\frac{1}{2}\,12 \cdot 12 \sin(90)$

$A_S = 144\pi - 288$

$A_S \approx 164.4\text{ cm}^2$

5.



$r = 4.4$
$n = 3$
$a = 4.4$
$b = 4.4$
$\theta = 120$

$A = \pi\, 4.4^2 - 3\frac{1}{2}\,4.4\,4.4 \sin 120$

$A = 19.36\pi - 25.1$

$A_S \approx 35.7\text{ in}^2$

6.

$A_S = \text{circle} - \text{hexagon}$

$r = 25,\ a = 25\ b = 25$

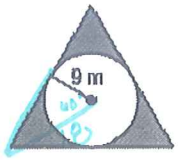
$\theta = 60$

$A_S = \pi 25^2 - 6\frac{1}{2}\,25 \cdot 25 \sin(60)$

$A_S = 625\pi - 6\frac{1}{2}\,25 \cdot 25 \sin(60)$

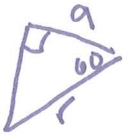
$A_S \approx 339.7\text{ ft}^2$

7.



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

$r = 18$



$r = 9$ $\quad a = 18$

$R = 18$ $\quad b = 18$

$\theta = 120^\circ$

$A_S = \Delta - \bigcirc$

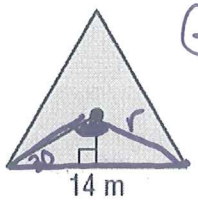
$A_S = 3\frac{1}{2}\,18 \cdot 18 \sin(120) - \pi 9^2$

$A_S = 166.4\text{ m}^2$

CCSS:

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

1.



Given Side

$\theta = 120^\circ$

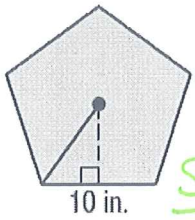
$\frac{\sin(120)}{14} = \frac{\sin(30)}{r}$

$r = 8.1$

$A = 3\,\frac{1}{2}\,8.1 \times 8.1 \sin(120)$

$A \approx 85.2\,m^2$

2.



Given Side

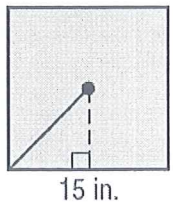
$\frac{\sin(54)}{r} = \frac{\sin(72)}{10}$

$r = 8.5$

$A = 5\,\frac{1}{2}\,8.5 \times 8.5 \sin(72)$

$A \approx 171.8\,in^2$

3.



15in

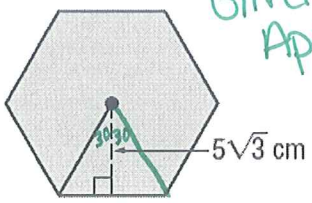
$A = b \cdot h$

$A = 15 \cdot 15$

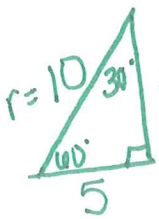
$A = 225\,in^2$

cool!!

4.



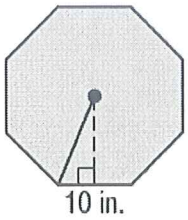
Given Apothem



$A = 6\,\frac{1}{2}\,10 \cdot 10 \sin(60)$

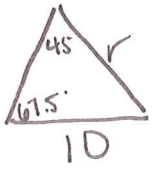
$A \approx 259.8\,cm^2$

5.



Given Side

$\theta = 45^\circ$



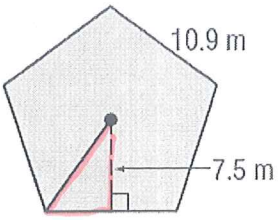
$\frac{\sin(67.5)}{r} = \frac{\sin(45)}{10}$

$r = 13.1\,in$

$A = 8\,\frac{1}{2}\,13.1 \cdot 13.1 \sin(45)$

$A \approx 485.4\,in^2$

6.



$\sin(54) = \frac{7.5}{r}$

$r = 9.3$

$A = 5\,\frac{1}{2}\,9.3 \times 9.3 \sin(72)$

$A \approx 205.6\,m^2$