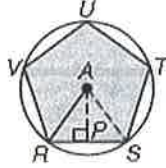


## Area of Regular Polygons Notes

In a regular polygon, the segment drawn from the center of the polygon perpendicular to the opposite side is called the **apothem**. In the figure,  $\overline{AP}$  is the apothem and  $\overline{AR}$  is the radius of the circumscribed circle.



<p><b>Area of a Regular Polygon</b></p>	<p>If a regular polygon has an area of <math>A</math> square units, a perimeter of <math>P</math> units, and an apothem of <math>a</math> units, then <math>A = \frac{1}{2}Pa</math>.</p>
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Find the area of each regular polygon. Round to the nearest tenth.

1.  $\frac{7 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{7\sqrt{3}}{3}$   
 $P = 42$   
 $A = \frac{1}{2}(42)\left(\frac{7\sqrt{3}}{3}\right)$   
 $A = 84.9 \text{ m}^2$

2.  $\frac{(5-2)180}{5} = \frac{108}{2} = 54$   
 $P = 50$   
 $\tan 36 = \frac{5}{x}$   
 $x \tan 36 = 5$   
 $x = 6.88$   
 $\frac{1}{2}(50)(6.88) = 172.0$   
 $172.0 \text{ in}^2$

3.  $A = 15(15) = 225 \text{ in}^2$   
 OR  
 $\frac{1}{2}(60)(7.5) = 225 \text{ in}^2$

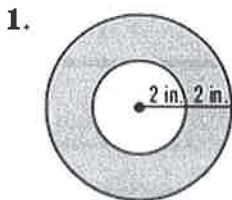
4.  $A = \frac{1}{2}(60)(5\sqrt{3})$   
 $A = 259.8 \text{ cm}^2$

5.  $\tan 22.5 = \frac{5}{x}$   
 $x \tan 22.5 = 5$   
 $x = 12.07$   
 $A = \frac{1}{2}(80)(12.07)$   
 $A = 482.8 \text{ in}^2$

6.  $A = \frac{1}{2}(54.5)(7.5)$   
 $A = 204.4 \text{ m}^2$

## Areas of Regular Polygons and Circles Notes

Find the area of each shaded region. Assume that all polygons are regular. Round to the nearest tenth.

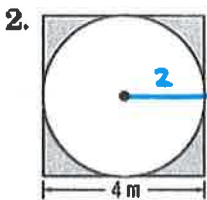


$$A = \pi(2)^2 = 4\pi$$

$$A = \pi(4)^2 = 16\pi$$

$$16\pi - 4\pi = 12\pi = 37.7$$

$A = 37.7 \text{ in}^2$



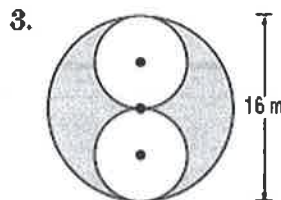
$$A = 4(4) = 16 \text{ m}^2$$

$$A = \pi(2)^2$$

$$A = 4\pi$$

$$A = 16 - 4\pi =$$

$3.4 \text{ m}^2$

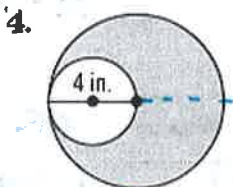


$$A = \pi(8)^2$$

$$A = \pi(4)^2 \cdot 2$$

$$A = 64\pi - 32\pi$$

$A = 100.5 \text{ m}^2$

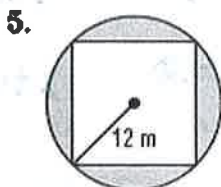


$$A = \pi(4)^2 = 16\pi$$

$$A = \pi(2)^2 = 4\pi$$

$$A = 16\pi - 4\pi = 12\pi$$

$A = 37.7 \text{ in}^2$



$$A = \pi(12)^2$$

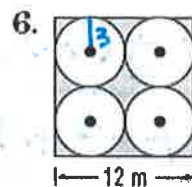
$$= 144\pi$$

$$A = 12\sqrt{2} \cdot 12\sqrt{2}$$

$$A = 288$$

$$A = 144\pi - 288$$

$A = 164.4 \text{ m}^2$



$$A = 12 \cdot 12 = 144$$

$$A = \pi(3)^2 = 9\pi \cdot 4$$

$$A = 144 - 36\pi$$

$A = 30.9 \text{ m}^2$