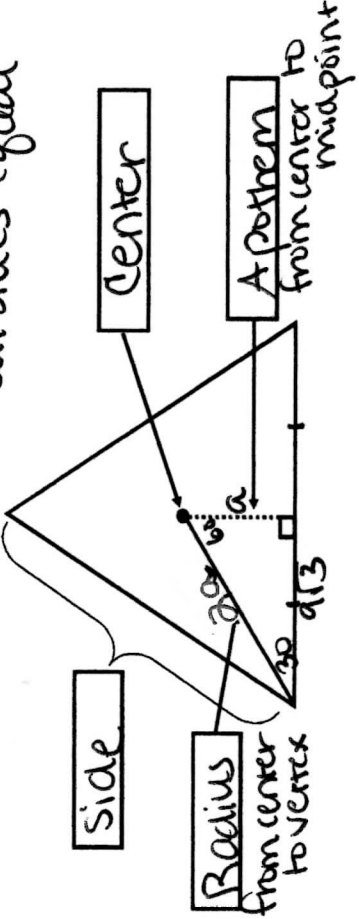


NOTES 11.3 - AREAS OF REGULAR POLYGONS

all sides equal



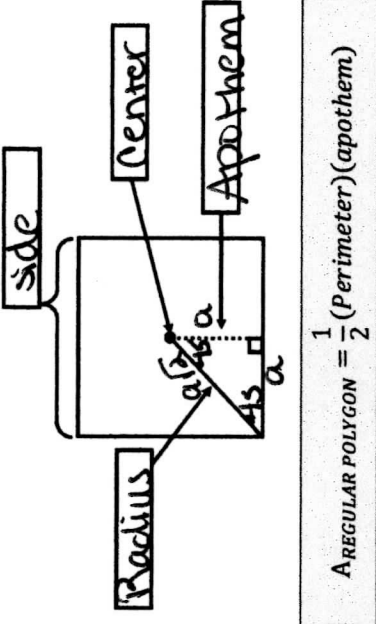
$$A_{\text{REGULAR POLYGON}} = \frac{1}{2} (\text{Perimeter}) (\text{apothem})$$

EXAMPLE 1: Find the indicated measures for the regular triangle.

$P = 12 + 12 + 12 = 36$
 $A = \frac{P \cdot a}{2} = \frac{36 \cdot (2\sqrt{3})}{2} = 36\sqrt{3}$
 $P = 36 \text{ cm}$
 $A = 36\sqrt{3} \text{ cm}^2$

EXAMPLE 2: Find the indicated measures for the equilateral triangle.

$P = 18 + 18 + 18 = 54$
 $A = \frac{54 \cdot (3\sqrt{3})}{2}$
 $A = 81\sqrt{3}$
 $A = \frac{81\sqrt{3} \cdot 3}{3}$



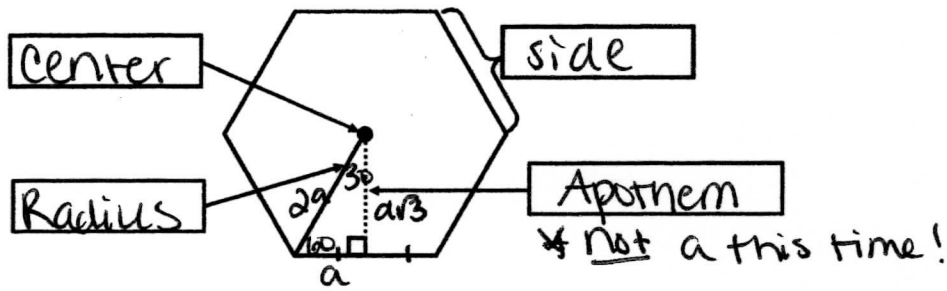
$$A_{\text{REGULAR POLYGON}} = \frac{1}{2} (\text{Perimeter}) (\text{apothem})$$

EXAMPLE 3: Find the indicated measures for the regular polygon below.

$P = 9 + 9 + 9 + 9 = 36$
 $A = \frac{36 \cdot (4.5)}{2}$
 $A = 81$
 $P = 36 \text{ in}$
 $r = 4.5\sqrt{2} \text{ in}$
 $A = 81 \text{ in}^2$

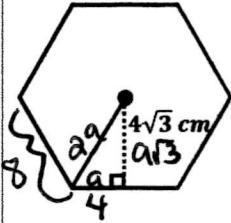
EXAMPLE 4: Find the indicated measures for the square below.

$r = a\sqrt{2} = 5\sqrt{2}$
 $a = 5$
 $P = 10 + 10 + 10 + 10 = 40$
 $A = \frac{40 \cdot (5)}{2} = 100$
 $a = \frac{5 \text{ cm}}{1}$
 $P = \frac{40 \text{ cm}}{1}$
 $A = \frac{100 \text{ cm}^2}{1}$



$$A_{\text{REGULAR POLYGON}} = \frac{1}{2} (\text{Perimeter})(\text{apothem})$$

EXAMPLE 5: Find the indicated measures for the regular polygon below.



$$a\sqrt{3} = 4\sqrt{3}$$

$$a = 4$$

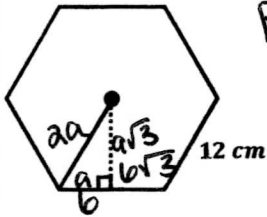
$$P = 8 + 8 + 8 + 8 + 8 + 8 = 48$$

$$A = \frac{48(4\sqrt{3})}{2}$$

$$P = \underline{48 \text{ cm}}$$

$$A = \underline{96\sqrt{3} \text{ cm}^2}$$

EXAMPLE 6: Find the indicated measures for the regular polygon below.



$$P = 12 + 12 + 12 + 12 + 12 + 12 = 72$$

$$A = \frac{72(6\sqrt{3})}{2}$$

$$A = 216\sqrt{3}$$

$$P = \underline{72 \text{ cm}}$$

$$a = \underline{6\sqrt{3} \text{ cm}}$$

$$A = \underline{216\sqrt{3} \text{ cm}^2}$$