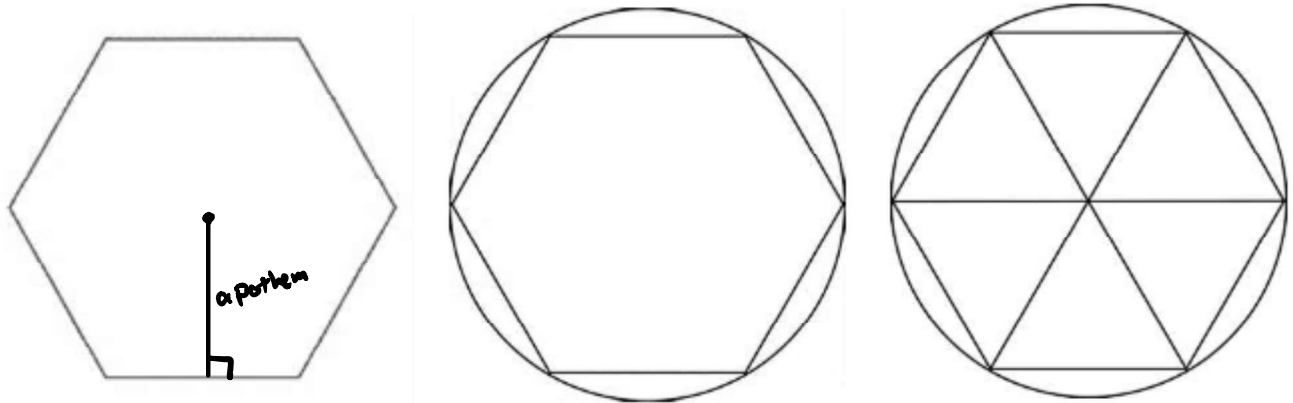


16.4 Area of Regular Polygons

NOTES

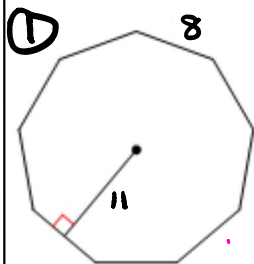
Write your questions here!

Regular Polygons: All sides and angles are congruent.



$$m\angle \text{Central} = \frac{360^\circ}{n}$$

Area of a Regular Polygon = $\frac{1}{2}(\text{apothem})(\text{perimeter})$



$$A_{\text{reg}} = \frac{1}{2}pa$$

$$= \frac{1}{2}(72)(11)$$

$$A = 396 \text{ in}^2$$

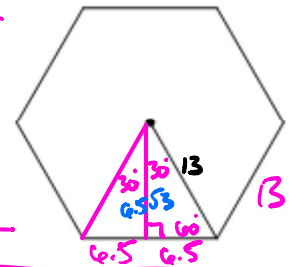
$$p = 8 \cdot 9$$

$$p = 72$$

$$m\angle C = \frac{360^\circ}{n}$$

$$= \frac{360^\circ}{6}$$

$$m\angle C = 60^\circ$$



$$p = 13(6)$$

$$p = 78$$

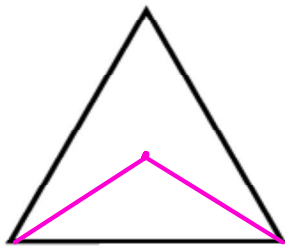
$$A_{\text{reg}} = \frac{1}{2}pa$$

$$= \frac{1}{2}(78)(6.5\sqrt{3})$$

$$A = 253.5\sqrt{3} \text{ in}^2$$

Finding the central angle:

②

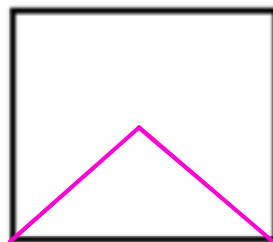


$$m\angle C = \frac{360^\circ}{n}$$

$$= \frac{360^\circ}{3}$$

$$m\angle C = 120^\circ$$

③

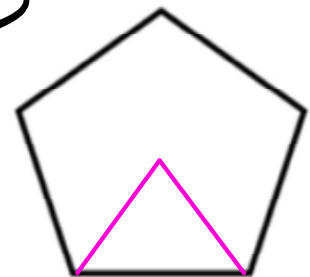


$$m\angle C = \frac{360^\circ}{n}$$

$$= \frac{360^\circ}{4}$$

$$m\angle C = 90^\circ$$

④



$$m\angle C = \frac{360^\circ}{n}$$

$$= \frac{360^\circ}{5}$$

$$m\angle C = \frac{360^\circ}{72}$$

Write your questions here!

SPECIAL RIGHT TRIANGLES

$30^\circ - 60^\circ - 90^\circ$
 $45^\circ - 45^\circ - 90^\circ$

PYTHAGOREAN THEOREM

$$a^2 + b^2 = c^2$$

TRIG FUNCTIONS

sin
 cos
 tan

TRY IT! Find the area of the following regular polygons:

Octagon
 Apothem = 4 ft
 Side = 6 ft

5

$$P = 6(6)$$

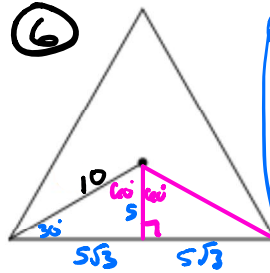
$$P = 36$$

$$A = \frac{1}{2} Pa$$

$$= \frac{1}{2} (36)(4)$$

$$A = 72 \text{ ft}^2$$

6



$$m\angle C = \frac{360^\circ}{n}$$

$$= \frac{360^\circ}{3}$$

$$m\angle C = 120^\circ$$

$$P = 3(10\sqrt{3})$$

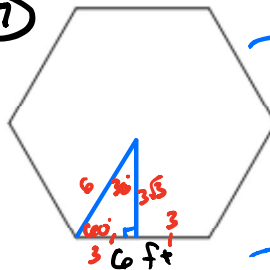
$$P = 30\sqrt{3}$$

$$A = \frac{1}{2} Pa$$

$$= \frac{1}{2} (30\sqrt{3}) (5)$$

$$A = 75\sqrt{3} \text{ in}^2$$

7



$$P = 6(6)$$

$$P = 36$$

$$m\angle C = \frac{360^\circ}{n}$$

$$= \frac{360^\circ}{6}$$

$$m\angle C = 60^\circ$$

$$A = \frac{1}{2} Pa$$

$$= \frac{1}{2} (36)(3\sqrt{3})$$

$$A = 54\sqrt{3} \text{ ft}^2$$

A regular pentagon with perimeter 40 cm.

8

$$P = n \cdot l$$

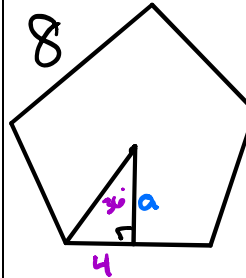
$$40 = 5l$$

$$8 = l$$

$$m\angle C = \frac{360^\circ}{n}$$

$$= \frac{360^\circ}{5}$$

$$m\angle C = 72^\circ$$



$$\tan 36^\circ = \frac{4}{a}$$

$$a \cdot \tan 36^\circ = 4$$

$$a = \frac{4}{\tan 36^\circ}$$

$$a \approx 5.51$$

$$A = \frac{1}{2} Pa$$

$$= \frac{1}{2} (40)(5.51)$$

$$A = 110.2 \text{ cm}^2$$

POLYGONS

Summarize your notes!

# of Sides	NAME
3	Triangle
4	Quadrilateral
5	Pentagon
6	Hexagon
7	Heptagon
8	Octagon
9	Nonagon
10	Decagon
11	Undecagon
12	Dodecagon
n	n-gon