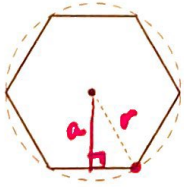


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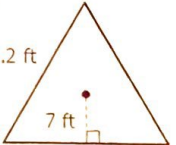
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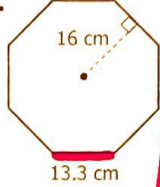
Topic: 8.3 Notes

Class:

| Main Ideas/Questions | Notes |
|------------------------------------|---|
| <h2>AREA of a REGULAR POLYGON</h2> | <p>Parts of a Regular Polygon: <i>* apothem is \perp to a side.</i></p> <ul style="list-style-type: none"> The distance from the center of a polygon to any side is called the <u>apothem</u>. The <u>radius</u> of a regular polygon is the distance from the center to a vertex. <p>Formula For Area of a Regular Polygon: <i>*</i> $A = \frac{1}{2}ap$</p> <p>a = apothem p = <u>perimeter</u></p>  |

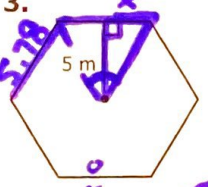
Examples: Find the area of each regular polygon.

1. 

2. 

$A = \frac{1}{2}ap$ $a = 16$
 $A = \frac{1}{2}(16)(106.4)$ $P = 13.3 \times 8 = 106.4$
 $A = 851.2 \text{ cm}^2$

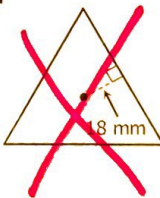
| | | |
|--|---|--|
| <p>Steps to find the apothem and/or side length.</p> | ① | Create a right triangle by drawing the apothem and radius. |
| | ② | Find the measure of the interior angle where the radius intersects the vertex. Use the interior angles sum formula ($S = (n - 2)180^\circ$), then divide by n, then by 2. |
| | ③ | Use special right triangles ($45^\circ-45^\circ-90^\circ/30^\circ-60^\circ-90^\circ$), or trigonometry (SOH CAH TOA) to find the apothem and/or side lengths. |

3. 

$A = \frac{1}{2}ap$
 $A = \frac{1}{2}(5)(34.68)$
 $A = 86.7 \text{ m}^2$

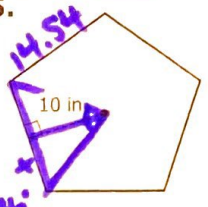
$\tan 30^\circ = \frac{x}{5}$ $P = 5.78 \times 6 = 34.68$
 $5 \tan 30^\circ = 2.89$ $\times 2$
 5.78

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

4. 

Steps:

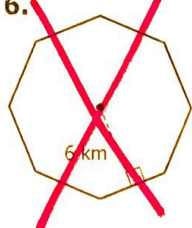
- Draw a triangle from the center of the polygon.
- Find the measure of the center angle: $\left(\frac{360}{\# \text{ of sides of polygon}}\right)$
- Cut triangle in half & make rt Δ .
- SOH CAH TOA

5. 

$A = \frac{1}{2}ap$
 $A = \frac{1}{2}(10)(72.65)$
 $A = 363.25 \text{ in}^2$

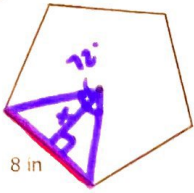
$\tan 36^\circ = \frac{x}{10}$ $P = 14.54 \times 5 = 72.65$
 $10 \tan 36^\circ = 7.27$ $\times 2$
 14.54

$\frac{360}{5} = 72^\circ$

6. 

$$P = 8 \cdot S = 40$$

7.



$$A = \frac{1}{2} a p$$

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

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

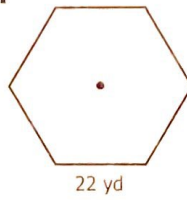


$$\tan 36 = \frac{4}{a}$$

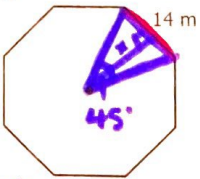
$$\frac{4}{\tan 36} = 5.51$$

$$\frac{360}{5} = 72^\circ$$

8.



9.



$$A = \frac{1}{2} a p$$

$$A = \frac{1}{2} (16.9)(112)$$

$$P = 14 \times 8 = 112$$



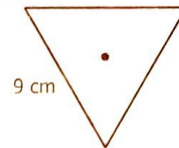
$$\tan 22.5 = \frac{7}{a}$$

$$\frac{7}{\tan 22.5} = 16.9$$

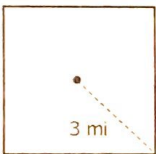
$$A = 946.4 \text{ m}^2$$

$$\frac{360}{8} = 45^\circ$$

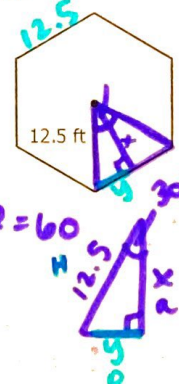
10.



11.



12.



$$A = \frac{1}{2} a p$$

$$A = \frac{1}{2} (10.83)(75)$$

$$A = 406.13 \text{ ft}^2$$

$$\cos 30 = \frac{x}{12.5}$$

$$12.5 \cos 30 = 10.83$$

$$\sin 30 = \frac{y}{12.5}$$

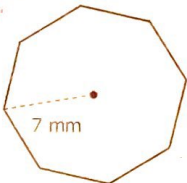
$$12.5 \sin 30 = 6.25$$

$$P = 12.5 \times 6 = 75$$

$$\frac{75}{2}$$

$$\frac{6.25 \times 2}{12.5}$$

13.



14.

