

In Exercises 1-4, use the diagram shown.

1. Identify the *center* of regular polygon ABCDE.

F

2. Identify a *central angle* of the polygon.
What is the measure of the *central angle*?

$$\angle AFE$$

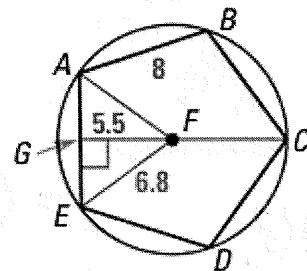
$$\frac{360}{5} = 72^\circ$$

3. Identify a *radius* of the polygon.
What is the length of the *radius*?

6.8

4. Identify the *apothem*.
What is the length of the *apothem*?

5.5



Find the measure of a central angle of a regular polygon with the given number of sides. Round to the nearest tenth of a degree if necessary.

5. 20 sides

$$\frac{360}{20} = 18^\circ$$

6. 7 sides

$$\frac{360}{7} = 51.4^\circ$$

7. 30 sides

$$\frac{360}{30} = 12^\circ$$

Find the given angle measure for the regular dodecagon shown.

8. $m\angle TWU = \frac{360}{12} = 30^\circ$

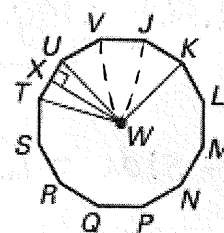
9. $m\angle TWX = \frac{30}{2}$
 $m\angle TWX = 15^\circ$

10. $m\angle XUW$

$90 - 15 = 75^\circ$

11. $m\angle TWK = 30(4)$

$m\angle TWK = 120^\circ$



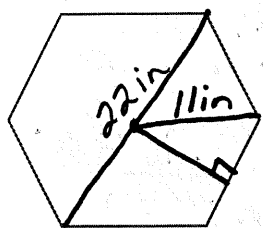
12. $m\angle UWK = 30(3)$

$m\angle UWK = 90^\circ$

13. $m\angle XWK = m\angle UWK + m\angle XWU$
 $90 + 15$

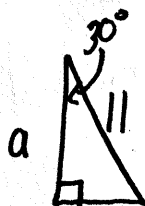
$m\angle XWK = 105^\circ$

14. A regular hexagon has a diameter 22 inches. What is the length of its apothem to the nearest hundredth?



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

$$\frac{60}{2} = 30^\circ$$



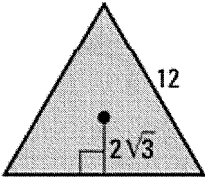
$$\frac{\cos 30}{1} = \frac{a}{11}$$

$$11 \cos 30 = a$$

$$\boxed{9.53 \text{ in} = a}$$

Find the perimeter and area of the regular polygon. Round answers to the nearest hundredth, if necessary.

15.



$$P = 12(3)$$

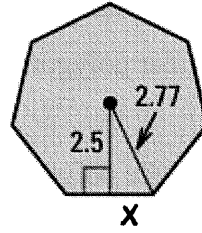
$$P = 36 \text{ u}$$

$$a = 2\sqrt{3}$$

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

$$A = 62.35 \text{ u}^2$$

16.



$$a = 2.5$$

$$P = 7(2.39)$$

$$P = 16.66 \text{ u}$$

$$\begin{aligned} 2.5^2 + x^2 &= 2.77^2 \\ -2.5^2 &\quad -2.5^2 \\ \hline \sqrt{x^2} &= \sqrt{1.4229} \end{aligned}$$

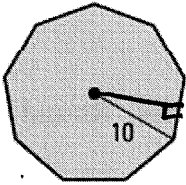
$$x \approx 1.19$$

$$2(1.19) = 2.38 = \text{side}$$

$$A = \frac{2.5(16.66)}{2}$$

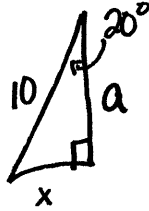
$$A = 20.83 \text{ u}^2$$

17.



$$\frac{360}{9} = 40^\circ$$

$$\frac{40}{2} = 20$$



$$\frac{\cos 20}{1} = \frac{a}{10}$$

$$10 \cos 20 = a$$

$$9.40 = a$$

$$\frac{\sin 20}{1} = \frac{x}{10}$$

$$10 \sin 20 = x$$

$$3.42 = x$$

$$n = 9$$

$$s = 6.84$$

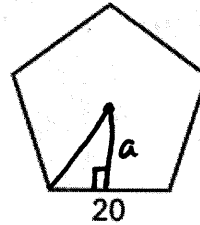
$$P = 9(6.84)$$

$$P = 61.56 \text{ u}$$

$$A = \frac{9.4(61.56)}{2} = 289.33 \text{ u}^2$$

$$2(3.42) = \text{side} = 6.84$$

18.



$$P = 20 \cdot 5$$

$$P = 100 \text{ u}$$

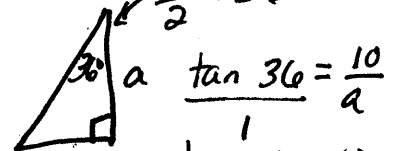
$$A = \frac{13.76(100)}{2}$$

$$A = 688 \text{ u}^2$$

Central \angle

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

$$\frac{72}{2} = 36$$

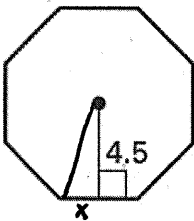


$$\frac{\tan 36}{1} = \frac{10}{a}$$

$$\frac{a \tan 36}{\tan 36} = \frac{10}{\tan 36}$$

$$a = 13.76$$

19.



$$a = 4.5$$

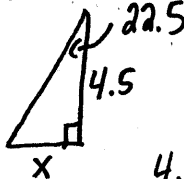
$$P = 8(3.72)$$

$$P = 29.76 \text{ u}$$

$$A = \frac{4.5(29.76)}{2}$$

$$A = 66.96 \text{ u}^2$$

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



$$\frac{\tan 22.5}{1} = \frac{x}{4.5}$$

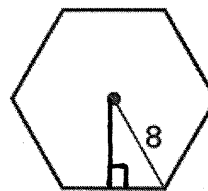
$$4.5 \tan 22.5 = x$$

$$1.86 = x$$

$$2(1.86) = \text{side}$$

$$3.72 = \text{side}$$

20.



$$a = 6.93$$

$$P = 6(8)$$

$$P = 48 \text{ u}$$

$$A = \frac{6.93(48)}{2} = 166.32 \text{ u}^2$$

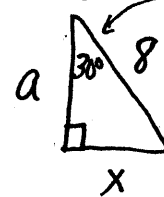
$$2(4) = \text{side}$$

$$8 = \text{side}$$

Central \angle

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

$$\frac{60}{2} = 30^\circ$$



$$\frac{\cos 30^\circ}{1} = \frac{a}{8}$$

$$8 \cos 30 = a$$

$$[6.93 = a]$$

$$\frac{\sin 30}{1} = \frac{x}{8} \quad x = 4$$

$$8 \sin 30 = x$$