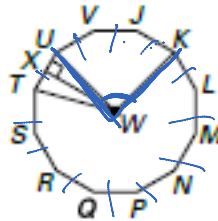


Find the measure of a central angle of a regular polygon with the given number of sides. Round answers to the nearest tenth of a degree, if necessary.

1. 20 sides $\frac{360}{20} = 18$ 2. 36 sides $\frac{360}{36} = 10$ 3. 120 sides $\frac{360}{120} = 3$ 4. 23 sides $\frac{360}{23} \approx 15.7$

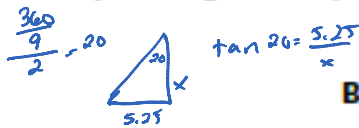
Find the given angle measure for the regular dodecagon shown.

5. $m\angle TWU$ $\frac{360}{12} = 30$ 6. $m\angle TWX$ $\frac{30}{2} = 15$
 7. $m\angle XUW$ $90 + 15 = 75$ 8. $m\angle TWK$ $4(30) = 120$
 9. $m\angle UWK$ $30 \cdot 3 = 90$ 10. $m\angle XWK$ $90 + 15 = 105$

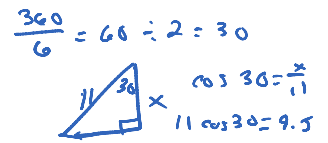


11. Multiple Choice Which expression gives the apothem for a regular nonagon with side length 10.5?

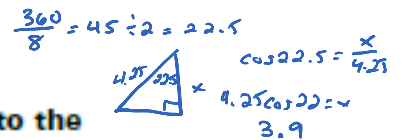
- A. $a = \frac{5.25}{\tan 40^\circ}$ B. $a = \frac{10.5}{\tan 20^\circ}$
 C. $a = \frac{5.25}{\tan 20^\circ}$ D. $a = 5.25 \cdot \tan 20^\circ$



12. A regular hexagon has diameter 22 inches. What is the length of its apothem? Round your answer to the nearest tenth. 9.5



13. A regular octagon has diameter 8.5 feet. What is the length of its apothem? Round your answer to the nearest tenth. 3.9



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

14. $\frac{360}{6} = 60 \div 2 = 30$
 $P = 6(8) = 48$
 $A = \frac{1}{2}(6 \cos 30)(8 \sin 30)(12) = 166.28$

15. $\frac{360}{5} = 72 \div 2 = 36$
 $P = 5(20) = 100$
 $A = \frac{1}{2}(5 \cos 36)(20 \sin 36)(100) = 688.2$

16. $\frac{360}{7} = 25.71$
 $P = 7(5) = 35$
 $A = \frac{1}{2}(7 \cos 25.71)(5 \sin 25.71)(35) = 68.9$

17. $\frac{360}{8} = 45 \div 2 = 22.5$
 $P = 8(4.5) = 36$
 $A = \frac{1}{2}(8 \cos 22.5)(4.5 \sin 22.5)(36) = 67.1$

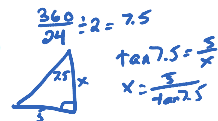
18. $\frac{360}{12} = 30 \div 2 = 15$
 $P = 12(5) = 60$
 $A = \frac{1}{2}(12 \cos 15)(5 \sin 15)(60) = 579.9$

19. $\frac{360}{18} = 20 \div 2 = 10$
 $P = 18(2.5) = 45$
 $A = \frac{1}{2}(18 \cos 10)(2.5 \sin 10)(45) = 163.3$

20. What is the area of a regular 18-gon with a side length of 8 meters? Round your answer to the nearest tenth, if necessary.

$\frac{360}{18} = 20 \div 2 = 10$
 $P = 18(8) = 144$
 $A = \frac{1}{2}(18 \cos 10)(8 \sin 10)(144) = 1633.3$

21. What is the area of a regular 24-gon with a side length of 10 inches? Round your answer to the nearest tenth, if necessary.



$$P = n(s) = 240$$

$$A = \frac{1}{2} \left(\frac{s}{\tan 7.5} \right) (240)$$

$$= 4557.5$$

22. What is the area of a regular 30-gon with a radius of 20 feet? Round your answer to the nearest tenth, if necessary.

$$\frac{360}{30} = 2 = 6$$

$$P = 20 \sin 6 (10) = 125.49$$

$$A = \frac{1}{2} (20 \cos 6) (125.49) = 1247.5$$

23. Find the area of a regular pentagon inscribed in a circle whose equation is given by

$(x - 4)^2 + (y - 6)^2 = 16$. $r = 4$ $\frac{360}{5} = 2 = 36$

$$P = 4 \sin 36 (10) = 23.5$$

$$A = \frac{1}{2} (4 \cos 36) (23.5) = 38.0$$

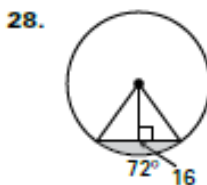
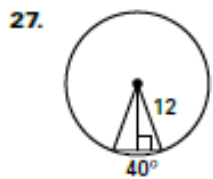
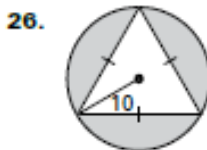
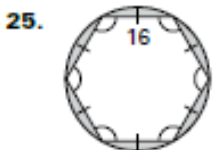
24. Find the area of a regular octagon inscribed in a circle whose equation is given by

$(x - 2)^2 + (y + 3)^2 = 25$. $r = 5$ $\frac{360}{8} = 2 = 22.5$

$$P = 5 \sin 22.5 (10) = 30.6$$

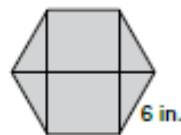
$$A = \frac{1}{2} (5 \cos 22.5) (30.6) = 70.7$$

Find the area of the shaded region. Round answers to the nearest tenth, if necessary.

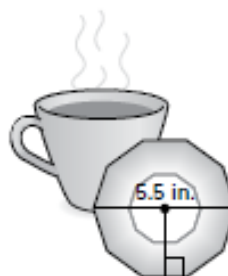


In Exercises 29 and 30, use the following information.

Tiles You are tiling the floor of a hallway with tiles that are regular hexagons as shown.



29. What is the area of each tile?
30. The hallway has a width of 5 feet and a length of 12 feet. At least how many tiles will you need?
31. A cup saucer is shaped like a regular decagon with a diameter of 5.5 inches as shown.



- a. What is the length of the apothem of the saucer? Round your answer to the nearest tenth.
- b. What is the perimeter and area of the saucer? Round your answers to the nearest tenth.

1. 18° 2. 10° 3. 3° 4. 15.7° 5. 30° 6. 15°
 7. 75° 8. 120° 9. 90° 10. 105° 11. C
 12. 9.5 in. 13. 3.9 ft 14. 48 units; 166.3 square units
 15. 100 units; 688.2 square units 16. 30.4 units; 68.4 square units
 17. 29.8 units; 67.1 square units 18. 60 units; 279.9 square units
 19. 16.4 units; 20.5 square units 20. 1633.3 m²
 21. 4557.5 in.² 22. 1247.5 ft²
 23. 38.0 square units 24. 70.7 square units
 25. 139.1 square units 26. 184.3 square units
 27. 4.0 square units 28. 28.3 square units

29. 93.5 in.² 30. at least 93 tiles 31. a. 2.6 in.
 b. 17.0 in.; 22.2 square inches