1. The measure of an interior angle of a regular polygon is165°; how many sides does the polygon have?
   A. 12   B. 18   C. 24   D. 30   E. NOTA

2. The area of a polygon is 196 sq. in. and its shortest side is 4 inches. Find the area of a similar polygon whose shortest side is 8 inches.
    A. 392   B. 588   C. 686   D. 784   E. NOTA

3. The sum of the interior angles of a polygon is ten times the sum of the exterior angles. How many sides does the polygon have?
    A. 23   B. 22   C. 21   D. 20   E. NOTA

4. The sum of seven angles in an octagon is 995 degrees. Find the measure of the remaining angle.
    A. 85   B. 75   C. 80   D. 90   E. NOTA

5. What is the total number of diagonals in a 20-gon?
    A. 160   B. 170   C. 180   D. 190   E. NOTA

6. Find the radius of a circle in which a chord two feet long is sixteen inches from the center.
    A. $4\sqrt{13}$ in.   B. $8\sqrt{13}$ in.   C. 15 in.   D. 20 in.   E. NOTA

7. How many sides has a heptadecagon?
    A. 7   B. 17   C. 19   D. 70   E. NOTA

8. What is the measure of angle E in the given diagram?
    A. 40° B. 30° C. 20° D. 10° E. NOTA
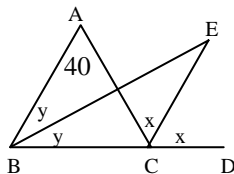

9. If the area of a regular hexagon is $51\sqrt{3}$, what is the radius of its inscribed circle?
    A. $.5\sqrt{102}$ B. $\sqrt{17}$ C. $\sqrt{102}$ D. $\sqrt{51}$ E. NOTA

10. Find the length of a span (shortest segment connecting two non-adjacent vertices) of a regular hexagon whose side is four units in length.
    A. $2\sqrt{3}$ B. $6\sqrt{3}$ C. 6   D. $4\sqrt{3}$ E. NOTA

11. In a tunnel with a cross section that is semicircular in shape, a vertical 10 ft. pole touches the top of the tunnel when the pole's foot is 4 feet from the side of the tunnel. What is the maximum height of the tunnel?

A. 50.5   B. 25   C. 30.5   D. 14.5   E. NOTA

12. To determine the radius of a railroad curve, an engineer measured AB and CD where D is the midpoint of arc AB. He found AB = 600 ft. and CD = 10 feet. What is the radius of the curve?
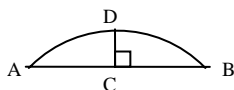

A. 4495   B. 17990   C. 8995   D. 4505   E. NOTA

13. The sides of a triangle are five, six, and seven. What is the length of the altitude to the longest side?

A. $\dfrac{30}{7}$ B. $\dfrac{12\sqrt{6}}{7}$ C. $\dfrac{24}{7}$ D. $\dfrac{15\sqrt{6}}{7}$ E. NOTA

14. A regular hexagon is inscribed in a circle of radius 8. What is the area of the part of the circle that is ***not*** inside the hexagon?

A. $64\pi - 32\sqrt{3}$ B. $64\pi - 96\sqrt{3}$ C. $32\sqrt{3}$ D. $96\sqrt{3}$ E. NOTA

15. Find the radius of the circle inscribed in a triangle with sides 10, 6, 8.

A. 2   B. 4   C. $\dfrac{3}{2}$ D. $\dfrac{12}{5}$ E. NOTA

16. $\overline{BA}, \overline{BD}, \overline{ED}$ are tangents to circle O. $BD = 8 + 6\sqrt{3}$ and $m\angle B = 60°$ How far would $\overline{CE}$ be from the center of circle O?
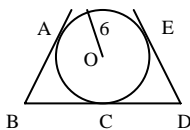
A. 4   B. $\dfrac{24}{5}$ C. $2\sqrt{2}$ D. $\dfrac{18}{5}$ E. NOTA

17. The radius of a circle is 5". Tangents drawn from an external point P form an angle of 120 degrees. How far is P from the center of the circle?

A. $\dfrac{5\sqrt{3}}{3}$ B. 5   C. 10   D. $\dfrac{10\sqrt{3}}{3}$ E. NOTA

18. In the figure tangents $\overline{AB}$ and $\overline{CD}$ are parallel and points A and C are on circle O. If $\overline{BD}$ is a tangent and point D is not on circle O, find the measure of $\angle BOD$.
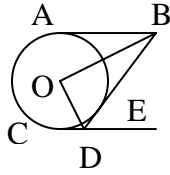
   A. 60° B. 120° C. 75° D. 105° E. NOTA

19. In $\triangle ABC,\ AC = BC$. If AC is extended its own length through C to D and $\overline{DB}$ is drawn, find the sum of $m\angle A$ and $m\angle D$.

   A. 60° B. 90° C. 120° D. 150° E NOTA

20. Find the area of a circle circumscribing a regular octagon whose side is 8 units in length.

   A. 64π B. 80π C. $64\pi + 32\pi\sqrt{2}$ D. $80\pi + 32\pi\sqrt{2}$ E. NOTA

21. Find the area of the circle which contains the points $(0,6),\ (6,0)$ and $(6,6)$.

   A. 18π B. 9π C. 36π D. 27π E. NOTA

22. Two circles of respective radii 7 and 5 are externally tangent to each other. How long is their common external tangent?

   A. $8\sqrt{3}$ B. $8\sqrt{3} - 12$ C. $2\sqrt{35}$ D. $2\sqrt{26} - 12$ E. NOTA

23. Find the radius of the circle which circumscribes polygon ABCD.
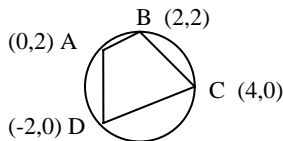
   A. $\sqrt{10}$ B. $4\sqrt{2}$ C. 5   D. $5\sqrt{2}$ E. NOTA

24. The area of a 30° sector of a circle is 100 square units. What is the area of an equilateral triangle inscribed in this circle?

   A. $\dfrac{300\sqrt{3}}{\pi}$ B. $\dfrac{900\sqrt{3}}{\pi}$ C. $\dfrac{450\sqrt{3}}{\pi}$ D. $\dfrac{150\sqrt{3}}{\pi}$ E. NOTA
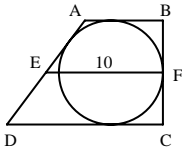
25. In circle O pictured below, points that appear to be collinear are collinear. The following measures are given: $m\angle A = 60°$, $m\angle ECF = 10°$, $m\ arcAF = m\ arc\ FE = 40°$ What is $m\angle FKO$?
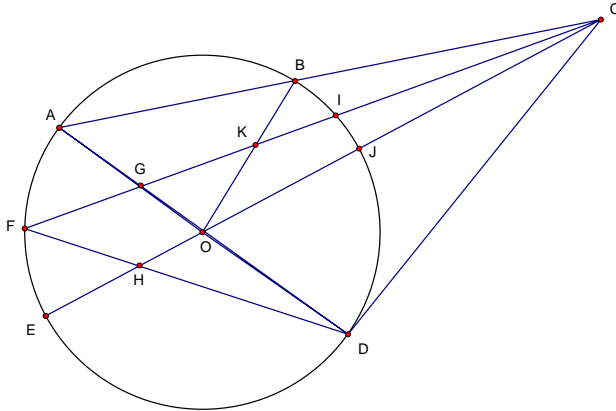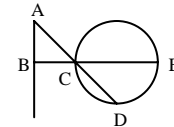

A. $90°$ B. $70°$ C. $50°$ D. $30°$ E. NOTA

26. Trapezoid ABCD is circumscribed around a circle as shown. Points E and F are midpoints of $\overline{AD}$ and $\overline{BC}$ respectively. What is the perimeter of ABCD?

A. 30   B. 38   C. 40   D. 48   E. NOTA

27. In the adjacent figure, $\overline{CE}$ is a diameter and angle ABC is a right angle. If AB = 4, AC = 5, and the circle has radius 10, find CD.

A. 16   B. $\dfrac{100}{9}$ C. 15   D. 12   E. NOTA

28. Find the area of a circle inscribed in a square whose sides are 10 inches in length.
    A. 25π B. 50π C. 75π D. 100π E. NOTA

29. What is the ratio of the area of a square inscribed in a circle to the area of the square circumscribing the same circle?
    A. 1 : 1   B. 1 : 2   C. 1 : 4   D. 1 : 8   E. NOTA

30. What is the area of a regular hexagon with side length $5\sqrt{3}$?
    A. $\dfrac{225\sqrt{3}}{2}$ B. $\dfrac{75\sqrt{3}}{2}$ C. $\dfrac{75}{4}$ D. $30\sqrt{3}$ E. NOTA