For all questions, answer choice "E. NOTA" means none of the above answers is correct

1. The measure of one exterior angle of a regular 20-gon is __?__
A. 18°   B. 3440°   C. 172°   D. 360°   E. NOTA

2. What is the greatest number of diagonals of a convex decagon that can be drawn from one vertex?
A. 10   B. 8   C. 7   D. 6   E. NOTA

3. A 10 foot ladder has one end on level ground and the other end 8 feet above the ground and against a vertical pole. As the foot of the ladder is pulled 1 foot farther away from the pole how far does the top of the ladder move down the pole?
A. $8 - 5\sqrt{3}$ B. 1   C. 2   D. $8 - \sqrt{51}$ E. NOTA

4. Bill has an $8" \times 10"$ piece of cardboard he wants to use to make a simple open top box. If he cuts a square with $2"$ sides from each corner of the cardboard and then folds up the tabs that are formed, what is the volume of the box he has formed?
A. $48 \ in^3$ B. $96 \ in^3$ C. $160 \ in^3$ D. $210 \ in^3$ E. NOTA

5. If two lines do not intersect they must be __?__
A. parallel   B. coplanar   C. horizontal   D. skew   E. NOTA

6. If two angles are both vertical and complementary each angle has a measure of __?__
A. 180°   B. 90°   C. 45°   D. 22.5°   E. NOTA

7. Points $A(2,-1)$, $B(5,-4)$, and $C(-1,-4)$ lie on circle O. What is the equation (standard form) of circle ?
A.   B.   C.   D.   E. NOTA
x²+y²-4x+8y+11=0   x²+y²+4x+8y+17=0   x²+y²+11=0   x²+y²+17=0

8. A sphere separates all the points of space into __?__ subsets.
A. 4   B. 3   C. 2   D. 1   E. NOTA

9. For sets A and B, $A \cup (A \cap B)$ must equal what?
A. A B. B C. $A \cup B$ D. $A \cap B$ E. NOTA

10. Evaluate the expression: 2(sum of exterior angles of a triangle) + 2(sum of the interior angles of a decagon) - 2(sum of the exterior angles of a pentadecagon).
A. 4320°   B. 3600°   C. 2880°   D. 2700°   E. NOTA

11. A plane that is not parallel to the bases passes through a cylinder without intersecting either base. What is the shape of the cross section of the plane and the cylinder?

A. parabola   B. hyperbola   C. circle   D. ellipse   E. NOTA

12. If $x \to 5 - \frac{1}{2}x,$ what value of x is its own image and pre-image?

A. $10/3$ B. 10   C. $5/3$ D. 5   E. NOTA

13. If the volume of a 4 inch tall right circular frustum is $52\pi \ in^3$ and the radius of the smaller base is 2 inches, what is the radius of the larger base?

A. 5 inches   B. $4 + \pi$ inches   C. $5 - 2\pi$ inches   D. 3.5 inches   E. NOTA

14. A water glass is in the shape of a right conical frustum which has a lower base of radius 2 inches and an upper base of radius 3 inches. If the distance between the bases is 6 inches, what is the volume of the glass?

A. $104\pi \ in^3$ B. $38\pi \ in^3$ C. $18\pi \ in^3$ D. $30\pi \ in^3$ E. NOTA

15. 3x–4y–12=0 is the equation of a line that along with the x-axis and the y-axis are the boundaries of a triangle. Which of the following is the equation of a vertical line that if used as a boundary instead of the y-axis and forms a triangle whose area is four times the area of the original triangle?

A. y=-6   B. x=-4   C. y=-2   D. x=-2   E. NOTA

16. What is the conclusion of the following statement? "An angle is a right angle if its measure is ninety degrees.

A. "its measure is ninety degrees"   B. "is a right angle"   C. "if its measure is ninety degrees"   D. "an angle is a right angle"   E. NOTA

17. A porch is 7 feet wide at the front door of a house. At a distance of 3 feet away from the house the porch immediately widens a foot on each side and then narrows to its original width. All sides of the porch are linear, and it takes 53 square feet of tile to cover the porch. What is the width of the porch 5 feet away from the house?

A. 7 feet   B. 7.5 feet   C. 8 feet   D. 8.5 feet   E. NOTA

18. An regular octagonal stop sign has a perimeter of 16 feet. A reflective band is painted around the edge of the sign forming a smaller octagon so the distance between each pair of corresponding vertices (one on the larger octagon, nearest one on smaller octagon) is $\sqrt{2}$ feet. What is the approximate perimeter of the new octagon?

A. 8.3 feet   B. 6.1 feet   C. 3.7 feet   D. 7.4 feet   E. NOTA

19. The base and top of a small bag used for organizing suitcase travel items shaped like a track around a football field with two straight edges and identical curves on both ends. It has three compartments formed by two vertical dividers which separate the curved sections from the straight edges. If each curve is a 90° circular arc, the length of each straight side is 5 inches, the length of each curve is 5 inches, and the distance between the base and the top of the bag is 5 inches, how much storage is available in one curved section?

A. $50(\pi - 2)/\pi^2$ B. $75(\pi - 2)/\pi^2$ C. $125(\pi - 2)/\pi^2$ D. $50(\pi - 2)/\pi$ E. NOTA

20. A trapezoid has shorter base of length 6 inches, distance between bases of 4 inches, and interior angles of 30 degrees and 60 degrees with the longer base. Find the area enclosed by the trapezoid.

A. $12\sqrt{2}$ square inches   B. $24 + \frac{32\sqrt{3}}{3}$ square inches   C. $36\sqrt{2}$ square inches   D. $12\sqrt{3}$ square inches   E. NOTA

21. A certain shopping mall has three levels with an open atrium. Paul is standing by the railing on the top level; Todd is directly across the atrium and by the railing on the middle level, while Laura is directly underneath Paul on the bottom level of the mall. Paul places his foot on the end of a 100 foot length of twine and tosses the rest of the twine to Todd who places his foot on the twine and tosses the remaining portion of twine to Laura. The twine is exactly long enough to reach to Laura's foot. If the distance between consecutive levels of the mall is 25 feet, what is the approximate width of the atrium?

A. $25\sqrt{3}$ feet   B. $50\sqrt{3}$ feet   C. $100\sqrt{3}$ feet   D. $125\sqrt{3}$ feet   E. NOTA

22. What is the radius (length from center of shape to a vertex) of a regular dodecagon whose perimeter is 36 feet?

A. $6sin(75°)$ B. $3sin(75°)$ C. $6sin(150°)$ D. $3sin(150°)$ E. NOTA

23. What is the measure of a central angle of a regular pentadecagon?

A. $36°/5$ B. $36°$ C. $18°$ D. $24°$ E. NOTA

24. A partially opened patio umbrella has a 30° angle of depression from the top of its 14 foot long center pole to the bottom of its center pole, with the bottom of its center pole resting on the ground. If each of the 8 ribs of the umbrella, which are all linear, is 8 feet long, and if the ends of two consecutive ribs are resting on the ground, how far apart, in feet are the tips of those 2 ribs?

A. $2\sqrt{15}$ B. $4\sqrt{3\sqrt{2}}$ C. $5\sqrt{2}$ D. $4\sqrt{6 - 6\sqrt{2}}$ E. NOTA

25. The ratio of the volumes of two spheres is 8:27. If the surface area of the smaller sphere is 64π what is the radius of the larger sphere?

A. 8   B. 12   C. 16   D. 27   E. NOTA

26. A decorative tray is created by cutting out congruent arcs of circles from the corners of a square 14 x 14 inch sheet of metal. If the vertices of the square are the centers of each arc, and if the closest distance between two arcs at consecutive vertices of the square is 2 inches, what is the perimeter, in inches, of the tray?

A. $196 - 36\pi$ B. $64 + 12\pi$ C. $8 + 12\pi$ D. $4 + 36\pi$ E. NOTA

27. If the radius of an equilateral triangle is 10 inches how long, in inches, is its apothem?

A. 5   B. 7.5   C. 10   D. 20   E. NOTA

28. A column in the shape of a hexagonal right prism has a base area of $24\sqrt{3}$. If the ratio of a base edge to the height of the column is 1:3 what is the total surface area of the column?

A. $144 + 24\sqrt{3}$ B. $288 + 48\sqrt{3}$ C. $432 + 48\sqrt{3}$ D. $3888 + 48\sqrt{3}$ E. NOTA

29. A $45°$ arc having length 4π is from a great circle of a sphere. What is the ratio of the volume of the sphere to its surface area?

A. 1:8   B. 1:3   C. 16:3   D. $32\pi : 3$ E. NOTA

30. A triangular prism has a height of 40 inches and regular triangle as a base. If radius of the base is 5 inches what is the volume, in cubic inches, of the prism?

A. $250\sqrt{3}$ B. $750\sqrt{3}$ C. $1500\sqrt{3}$ D. $3000\sqrt{3}$ E. NOTA