For all questions, answer choice (E) NOTA means that none of the given answers is correct. Good Luck!

1. Which of the following is not a platonic solid?
   (A) Icosahedron (B) Cube (C) Pentahedron (D) Dodecahedron (E) NOTA

2. Let point A be at $(7, 8)$ and point B be at $(3, 5)$. If point C is 3 units below point A and 4 units to the right of point B, what is the area of the figure enclosed by points A, B, and C?
   (A) 12 (B) 6 (C) 10 (D) 24 (E) NOTA

3. What is the sum of the roots of the function $f(x) = x^3 - 19x + 30$?
   (A) 19 (B) 8 (C) 0 (D) 7 (E) NOTA

4. What is the volume of a regular hexahedron inscribed in a sphere of radius 6?
   (A) 216 (B) $192\sqrt{3}$ (C) 192 (D) $216\sqrt{3}$ (E) NOTA

5. What is the remainder when $x^3 - 6x^2 + 18x - 14$ is divided by $x - 2$?
   (A) 6 (B) 10 (C) -6 (D) -10 (E) NOTA

6. In how many distinct ways can you rearrange the letters in the word LARFLEEZE?
   (A) 362880 (B) 504 (C) 84 (D) 60480 (E) NOTA

7. Find the determinant of the inverse of the matrix:

$$\begin{bmatrix} 3 & -2 \\ 6 & -4 \end{bmatrix}$$

   (A) 0 (B) 24 (C) 12 (D) $\frac{1}{12}$ (E) NOTA

8. If the remainder when $x^3 - 12x^2 + 18x + k$ is divided by $(x - 3)$ is -3, then what is the value of k?
   (A) 9 (B) -9 (C) 27 (D) 24 (E) NOTA

9. What is the area of a regular hexagon that is inscribed in a circle with diameter of 8?
   (A) $16\sqrt{3}$ (B) 16 (C) $12\sqrt{3}$ (D) 24 (E) NOTA

10. Find the value of $x^3 - y^3$ given that $x - y = 2$ and $xy = 15$.
    (A) 98 (B) 45 (C) 49 (D) 125 (E) NOTA

11. Superman and Green Lantern must evacuate passengers from a sinking ship. If Superman can evacuate the ship in 20 minutes, and Green Lantern can evacuate the ship in 30 minutes, how many minutes will it take for the two of them to evacuate the ship together?
    (A) 25 (B) 10 (C) 12 (D) 15 (E) NOTA

12. Given that $A = \log 2$, $B = \log 3$, and $C = \log 5$, express $\log 60 - \log 40$ in terms of A, B, and C.
    (A) $2A + B + C$ (B) $3A + C$ (C) $5A + B + 2C$ (D) $B - A$ (E) NOTA

13. Triskaidekaphobia is the fear of the number 13. Suppose 1 in every 13 math students suffers from triskaidekaphobia, and is guaranteed to answer question 13 on a math test incorrectly, while a student who does not suffer from triskaidekaphobia has a 1 in 13 chance of incorrectly answering it. If 169 math students each take a 30-question math test, how many of them will answer question 13 incorrectly?

(A) 13 (B) 25 (C) 26 (D) 39 (E) NOTA

For questions 14-15, refer to the following information:
Awnish has a magic ball in the shape of a perfect sphere, with a diameter of 10 centimeters. Whenever the ball hits the sidewalk, its radius decreases by 1 centimeter. Awnish throws his ball, and it bounces 4 times on the sidewalk before landing in a half- filled cylindrical bucket of water with a radius of 5 centimeters and a height of 15 centimeters. The ball is then completely submerged in the water and the water level in the bucket rises.

14. By how many square centimeters did the ball's surface area change from time it left Awnish's hand to the time it landed at the bottom of the bucket?

(A) 76π (B) 144π (C) 204π (D) 256π (E) NOTA

15. After the ball lands at the bottom of the bucket, by how many centimeters, to the nearest tenth of a centimeter, does the water level in the bucket rise?

(A) 1 (B) 1.4 (C) 2 (D) 2.6 (E) NOTA

16. Find the value of the infinite series: $\frac{1}{2}+\frac{1}{3}+\frac{2}{9}+\frac{4}{27}+\frac{8}{81}+...$

(A) $\frac{6}{5}$ (B) $\frac{3}{2}$ (C) $\frac{2}{3}$ (D) 2 (E) NOTA

17. Abhi throws a football. The height of the football after t seconds is given by the equation $12t-2t^2$. After how many seconds does the ball reach its maximum height?

(A) 18 (B) 3 (C) 27 (D) 9 (E) NOTA

18. Find the value of $\sqrt{12+\sqrt{12+\sqrt{12+...}}}$

(A) 3 (B) 12 (C) -3 (D) 4 (E) NOTA

19. Find the equation of the directrix of the parabola $y=x^2-8x+8$.

(A) $y=\frac{-33}{4}$ (B) $y=\frac{-31}{4}$ (C) $y=\frac{33}{4}$ (D) $y=\frac{31}{4}$ (E) NOTA

20. Convert 31_8 to base 10.

(A) 24 (B) 25 (C) 26 (D) 27 (E) NOTA

21. Due to a freak accident involving a lightning bolt and some spilled chemicals, Siddarth gained a connection to the Jump Force, which allows him to jump extremely far and high. He decides to test his newfound abilities and tries to travel from the east coast to the west coast (for the sake of this question, let that distance be 5000 km) in a series of jumps. He jumps 50 km on his first jump, and each successive jump is 100 km longer than the last. How many jumps does it take him to travel from the east coast to the west coast?

(A) 8 (B) 9 (C) 10 (D) 11 (E) NOTA

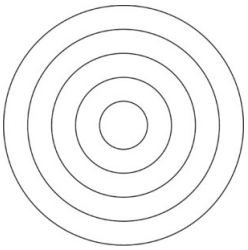
22. Green Lanterns Hal Jordan, Jon Stewart, Guy Gardener, and Kyle Rayner create a sphere of radius 4, a cube of side length 4, a regular tetrahedron of side length 4, and a cylinder of radius 4 and height of 4, respectively. Who created the figure with the greatest volume?

(A) Hal Jordan (B) Jon Stewart (C) Guy Gardener (D) Kyle Rayner (E) NOTA

23. A tall pole is stabilized by a 5-meter guywire that reaches from the ground to a point that is halfway up the pole, and makes a 30° angle with the ground. How many meters tall is the pole?

(A) 2.5 (B) 5 (C) $2.5\sqrt{3}$ (D) $5\sqrt{3}$ (E) NOTA

24. Stephen is throwing darts at the following dartboard formed by 5 concentric circles of radii 1, 2, 3, 4, and 5. If Stephen has a $\frac{3}{5}$ chance of hitting the dartboard, what is the probability of him hitting the outermost ring of the board?



(A) $\frac{9}{25}$ (B) $\frac{16}{25}$ (C) $\frac{48}{125}$ (D) $\frac{27}{125}$ (E) NOTA

25. Find the value of $[\sqrt{1}]+[\sqrt{2}]+[\sqrt{3}]+\ldots+[\sqrt{34}]+[\sqrt{35}]+[\sqrt{36}]$, given that $[x]$ denotes the greatest integer function.

(A) 36 (B) 131 (C) 630 (D) 2014 (E) NOTA

26. Find the sum of the units digits of 3^{2014} and 7^{2014}.

(A) 10 (B) 18 (C) 0 (D) 2 (E) NOTA

27. There are two water tanks, a cylindrical tank and a conical tank in Tallahassee. Both tanks have the same radius and same volume. If the height of the cylindrical tank is 8 meters and the radius of both of the tanks is 6 meters, find the height of the conical tank in meters.

(A) 8 (B) 12 (C) 16 (D) 24 (E) NOTA

28. Find $\log_2(\frac{1}{2}) + 3\log_3(\frac{1}{9}) + 4\log_4(64) - \log_{125}(5)$.

(A) $\frac{16}{3}$ (B) 2 (C) $\frac{14}{3}$ (D) 3 (E) NOTA

29. Find the volume of the solid created when the figure bounded by the x-axis, y-axis, $y = 4$ and $y = x + 4$ is rotated about the y-axis.

(A) 21π (B) $\frac{64\pi}{3}$ (C) 64π (D) 63π (E) NOTA

30. Find $x + y + z$, given that:

$$\begin{aligned} 3x + y - 2z &= -1 \\ 2x - 3y + z &= 0 \\ 5x + 2y - 3z &= 1 \end{aligned}$$

(A) 10 (B) 5 (C) 7 (D) 8 (E) NOTA