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

1. Find the sum of the first 100 terms of the sequence: $-73, -66, -59 \ldots$

    (A) 620   (B) 621   (C) 27977   (D) 27350   (E) NOTA

2. The supplement of twice my angle is equal to 37 more than the complement of my angle. Solve for twice my angle.

    (A) $37°$ (B) $53°$ (C) $74°$ (D) $106°$ (E) NOTA

3. Which of the following is equal to i^{2018}?

    (A) 1   (B) -1 (C) i (D) $-i$ (E) NOTA

4. Find the sum of all of the real roots of $-5x^2 + 3x^3 - 2x + x^5 - 2x^4 - 6$.

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

5. Isaiah is stuck on his math homework. Find the remainder of $\dfrac{x^3 + 11x^2 + 34x + 26}{x + 6}$ to help him.

    (A) -2 (B) 0   (C) 2   (D) 4   (E) NOTA

6. Sanjita is a drinkie (as opposed to a foodie). Sanjita visits a certain cola world in Atlanta very often. Sanjita has $57.18 to purchase cola. If cola costs $0.06 per ounce for the first five ounces, $0.10 per ounce for the next ten ounces, $0.12 per ounce for the next 20 ounces, and $0.28 per ounce for every additional ounce, what is the maximum amount of cola, in ounces, that she can purchase?

    (A) 220 ounces   (B) 226 ounces   (C) 261 ounces   (D) 191 ounces   (E) NOTA

7. Sri and Leana have gone on different paths, but they will eventually intersect again. If Sri is traveling on the line $x + 3y = -7$ and Leana is traveling on the line $y = 4x + 2$, at what point will their paths intersect?

    (A) $(1, 6)$ (B) $(-4, -1)$ (C) $(-1, -2)$ (D) $(2, -3)$ (E) NOTA

8. Find the domain of $(x^2 - 5x + 6)^{-\frac{1}{2}}$.

    (A) $(-\infty, 2) \cup (3, \infty)$ (B) $(2, 3)$ (C) $(-\infty, 2) \cup (2, 3) \cup (3, \infty)$ (D) $(3, \infty)$ (E) NOTA

9. Factor the following expression completely: $56x^2 + 147x - 63$. Which of the following is a factor of this expression?

    (A) $7x - 3$ (B) $14x - 9$ (C) $8x - 7$ (D) $4x + 21$ (E) NOTA

10. Jason Gao and Jason Zhang want to find the area of their restaurant, Chez Jason, which is bounded by the lines $-5 = 2x + y$, $4 = -2x + y$, $y = 0$, and $y = 6$. What is the area of Chez Jason, in square units (round to the nearest hundredth)?

    (A) 21.13   (B) 22.75   (C) 24.38   (D) 21.00   (E) NOTA

11. Aniketh has a meme that he wants to post, but he forgot the password to his laptop! His password is the sum of the coefficients of the standard form equation of the parabola that passes through the points $(2, 8)$, $(-1, 3)$, and $(1, 5)$. What is Aniketh's password?

    (A) 4   (B) 5   (C) 16   (D) 14   (E) NOTA

12. What is the discriminant of $5x + 10x^2 - 30 = 0$?

    (A) -625 (B) 700   (C) -500 (D) 1225   (E) NOTA

13. If the vertex of parabola $y = 27x^2 + 108x - 29$ is given by (x, y), what is $\frac{1}{2}x + y$?

    (A) -136 (B) -137 (C) -138 (D) -139 (E) NOTA

14. Solve for c given that $27^c = 81$.

    (A) $-\dfrac{3}{4}$ (B) $-\dfrac{1}{3}$ (C) $\dfrac{4}{3}$ (D) $\dfrac{7}{6}$ (E) NOTA

15. What is the area on the Cartesian plane of the polygon bounded by the following system of inequalities?

$$
\begin{aligned}
y &< 4x + 3 \\
x + 4y &< 12 \\
y &> -1
\end{aligned}
$$

    (A) 34   (B) 68   (C) 294   (D) 566   (E) NOTA

16. Find x if the slope between the points $(6, x)$ and $(18, 7)$ is $\dfrac{13}{24}$.

    (A) $-\dfrac{1}{2}$ (B) $-\dfrac{81}{6}$ (C) 2   (D) $\dfrac{1}{2}$ (E) NOTA

17. Which of the following are natural numbers?
    I. -14
    II. $\sqrt{196}$
    III. 0

    (A) I. only   (B) III. only   (C) I. and II. only   (D) I., II., and III.   (E) NOTA

18. What is the sum of the solutions to the following equation?

$$
x = \sqrt{12 + \sqrt{12 + \sqrt{12 + \ldots}}}
$$

    (A) 7   (B) 1   (C) -3   (D) -1   (E) NOTA

19. If $f(x^2 + x - 3) = 3x - 1$ for $x > 0$, find the value of $f(3)$.

    (A) -10 (B) 5   (C) 8   (D) 26   (E) NOTA

20. The number of clout points Zhoushoumao has is equal to the sum of the first 9 odd natural numbers, the first 48 positive even numbers, and the first two odd prime numbers. Calculate the number of clout points Zhoushoumao has.

    (A) 2337   (B) 2385   (C) 2345   (D) 2441   (E) NOTA

21. Find the sum of the values of t such that the equation $x^2 + (t-9)x - 12t = 0$ has a solution with a multiplicity of 2.

    (A) -30   (B) -3   (C) 3   (D) 27   (E) NOTA

22. On the Cartesian plane, Tanvi's house is located at the origin, her school is located at the point $(7, 9)$, and a river runs along the line $y = 15$. Starting from home, what is the shortest distance Tanvi can travel to school if she stops to drink water from the river?

    (A) $\sqrt{130}$ (B) $\sqrt{490}$ (C) $\sqrt{274}$ (D) $15 + \sqrt{85}$ (E) NOTA

23. What is the decimal number value $472_8 + 36_8$?

    (A) 530   (B) 508   (C) 344   (D) 492   (E) NOTA

24. Drake has only goats and chickens on his farm. On his farm he counts 81 heads and 204 legs. How many chickens does Drake have?

    (A) 60   (B) 59   (C) 118   (D) 120   (E) NOTA

25. Alex is deciding what to wear to school. He can choose between 5 top hats, 12 pairs of socks, and 7 pairs of football shoulder pads. How many distinct combinations of a top hat, two pairs of socks, and a pair of football shoulder pads can Alex choose to wear to school?

    (A) 210   (B) 420   (C) 2310   (D) 4620   (E) NOTA

26. Your incredibly rich great-grandmother has included you in her will! To find out what she has left to you, you must solve a math problem. If x is inversely proportional to y and directly proportional to the cube of a and $x = 4$ when $y = 6$ and $a = 2$, then find x when $y = 18$ and $a = 3$.

    (A) 3   (B) $\dfrac{8}{9}$ (C) 2   (D) $\dfrac{9}{2}$ (E) NOTA

27. What is the degree of $3xy^2 + 4x^4y^5z^{23} - 6x^2y^{28}z$?

    (A) 31   (B) 28   (C) 32   (D) 34   (E) NOTA

28. Hitesh and Aniketh love spicy wings. If six of their friends can eat twelve spicy wings in six seconds, how many spicy wings can eighteen of their friends eat in six seconds?

    (A) 12   (B) 18   (C) 38   (D) 24   (E) NOTA

29. Jackson S. wants to make the most tasty cockroach solution he can. He currently has a solution of volume 10 cups that is 60% cockroach and wants to dilute it. How many cups of 35% cockroach solution should he add to his current solution to make a perfect solution that is 40% cockroach?

    (A) 64   (B) 58   (C) 48   (D) 40   (E) NOTA

30. What is the area of $\triangle ABC$ with vertices $A(2,1)$, $B(4,5)$ and $C(7,8)$ on the Cartesian plane?

    (A) 3   (B) 6   (C) 52   (D) 0   (E) NOTA