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

1. Farzan loves eating chips. He can eat 3 party sized bags in a day. However, his dad does not approve. Therefore, Farzan is only allowed 20% of a party sized bag on each of the weekdays and 1 whole party size bag on each of the weekend days. Over the course of 2019, how many party sized bags will he have consumed? (Assume that a year consists of 52 complete weeks, and January 1st, 2019 fell on a Tuesday.)

   (A) $\frac{469}{3}$ (B) 1095 (C) 150 (D) $\frac{467}{3}$ (E) NOTA

2. Given that $i = \sqrt{-1}$, what is the value of $3(((i^3)^2)^4) + 5i$? Express your answer in terms of i.

   (A) $3 + 5i$ (B) $8i$ (C) $5i - 3$ (D) $2i$ (E) NOTA

3. Find the sum of the first 70 natural numbers minus the sum of the first 30 whole numbers plus the sum of the first 20 counting numbers.

   (A) $1,840$ (B) $2,200$ (C) $2,240$ (D) $2,260$ (E) NOTA

4. Shreyas really wants to score a goal in his next soccer game, so he wants to survey the soccer field which he will be playing on. The soccer field is a rectangle, 120 yards long and 240 feet wide. Help Shreyas score a goal by finding how much space each of the 22 players on the soccer field will cover to the nearest square inch (assuming each person covers the same amount of space and the entire field is covered).

   (A) $1,309$ square inches (B) $15,009$ square inches (C) $47,000$ square inches (D) $47,127$ square inches (E) NOTA

5. Prabhas finally achieved his goal of becoming a fish and everyone is proud. Out of joy, Prabhas invited 5 of his friends to celebrate by having dinner around a round table. How many distinct possible ways could Prabhas and his friends be sitting? (A seating pattern that can be found by rotating a previously counted pattern should not be counted separately.)

   (A) 80 (B) 120 (C) 720 (D) 1024 (E) NOTA

6. Nihar is happy that Rickards did well at the State Convention and yelled, "WAYTOGO". In response, Rayyan said, "Hey that phrase can be arranged in x ways." What is the value of x?

   (A) 630 (B) $1,260$ (C) $2,520$ (D) $5,040$ (E) NOTA

7. Solve for all values of x such that $x = \sqrt{12 + 4x}$.

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

8. Find the sum of the reciprocals of the zeroes of the equation $x^2 + 5x - 36 = y$.

   (A) -5 (B) $\frac{1}{36}$ (C) $\frac{5}{36}$ (D) $\frac{7}{36}$ (E) NOTA

9. Find the sum of all integral factors of $20,192,019$.

   (A) 0 (B) 24 (C) 2019 (D) $1,560,320$ (E) NOTA

10. Rohan wants to be on time to Mr. Juhasz's class, and he decides to calculate the smallest angle between the hour and minute hand on the clock. What angle would Rohan calculate if the time was 12:14 pm?

    (A) 77 (B) 154 (C) 206 (D) 283 (E) NOTA

11. What quadrants does the graph of $y = 3x + 6$ go through?

    (A) I, III, IV (B) II, III, IV (C) I, II, IV (D) I, II, III (E) NOTA

12. Rishil and Siri have been feuding for years. In order to determine the true winner of this fight (The Greatest Battle of 2019), they decide to have a golf battle, like mature 6th graders. The 4th triangular number is the amount of points that Rishil scores. The square of the 4th natural number is the amount of points that Siri scores. Who wins The Greatest Battle of 2019?

(A) Rishil (B) Siri (C) Both of them tie (D) This question cannot be answered (E) NOTA

13. Dylan wants to calculate how many digits there are when he combines all the page numbers in his book. Given that his book has 309 pages starting at page 1, how many total digits are in his book?

(A) 189 (B) 800 (C) 819 (D) 837 (E) NOTA

14. Tanvi is trying to figure out the total perimeter of a 2D object on her desk. It is a circle inscribed in a triangle inscribed in a square. Assuming the triangle is equilateral and the circle has a radius of 5, what is the sum of the perimeter of the square, the circle, and the triangle?

(A) $20\sqrt{3} + 25\pi$ (B) $40\sqrt{3} + 10\pi$ (C) $70\sqrt{3} + 10\pi$ (D) $80\sqrt{3} + 10\pi$ (E) NOTA

15. If $x + y = 17$ and $x \cdot y = 43$, what is the value of $x^2 + y^2$?

(A) 200 (B) 203 (C) 204 (D) 205 (E) NOTA

16. If Shreyas can eat 3 donuts in 30 seconds and Jeffrey can eat 5 donuts in 2 minutes, how long, in minutes, will the pair take to eat 187 donuts if they both eat at a continuous pace?

(A) 15 (B) 16 (C) 21 (D) 22 (E) NOTA

17. Find the equation of the line that is perpendicular to $2x + 3y = 12$ and passes through the point $(2, 5)$.

(A) $y = \frac{3}{2}x + 2$ (B) $y = \frac{3}{2}x + 3$ (C) $y = \frac{2}{3}x + 2$ (D) $y = \frac{2}{3}x + 3$ (E) NOTA

18. Which property is demonstrated here: $a \cdot (b + c) = a \cdot b + a \cdot c$?

(A) Commutative Property of Addition (B) Commutative Property of Multiplication

(C) Identity Property of Multiplication (D) Fermat's Last Theorem (E) NOTA

19. Dylan likes to keep his textbooks in pairs and based on subject. He has 6 pairs of history books, 3 pairs of science books, 2 pairs of math books, and 5 pairs of English books. If Dylan picks two pairs of textbooks at random without replacement, what is the probability he picks a pair of English books and then a pair of math books?

(A) $\frac{1}{30}$ (B) $\frac{1}{24}$ (C) $\frac{1}{16}$ (D) $\frac{1}{12}$ (E) NOTA

20. Imagine a cone with radius 3 and height 4. What is the ratio between the lateral surface area, the total surface area, and the volume?

(A) 5 : 8 : 4 (B) 6 : 9 : 2 (C) 3 : 7 : 5 (D) 4 : 8 : 5 (E) NOTA

21. Farzan considers himself a professional sprinter. He is able to run 300 yards per minute. However, there is a sound blocker nearby which slows him down by 6 inches per second. How long will it be, in minutes, until the sound blocker catches up to Farzan?

(A) 6 minutes (B) 4 minutes (C) 30 minutes (D) 10 minutes (E) NOTA

22. If $f(x) = 3x + 2$ and $g(x) = 2x + 7$, find the value of this equation $f(g(f(f(g(g(2) + 2)))))$.

(A) 1800 (B) 1791 (C) 631 (D) 1853 (E) NOTA

23. Farzan, Prabhas, Mihir, Shreyas, and Ishrit stand in a line based on height. If Ishrit is 6 inches taller than Mihir, Shreyas is not the tallest, Farzan is second to last, Shreyas is taller than Prabhas, and Mihir is the shortest, who is in the front of the line?

(A) Prabhas (B) Ishrit (C) Shreyas (D) Farzan (E) NOTA

24. Are you having fun through this test? It's almost over! What is the value of i^{60}?

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

25. In math, a perfect number is one whose factors (excluding itself) add up to the number itself. For instance, the number 28 is a perfect number because $7 + 4 + 14 + 2 + 1 = 28$. Find the only perfect number smaller than 28.

(A) 12 (B) 16 (C) 24 (D) 6 (E) NOTA

26. If Anirudh is 5 feet and 5 inches tall and casts a 7 foot shadow, how tall is the flagpole next to him, given that it casts a 20 foot shadow? Round to the nearest whole number.

(A) 200 inches (B) 180 inches (C) 183 inches (D) 186 inches (E) NOTA

27. Rayyan needs to find the magic pencil to solve all his problems. Rayyan is located at $(-3, 5)$ and the magic pencil is located at point $(8, 10)$. Before he can get it, however, he needs to get some paper from a local line at $x = -1$. What is the shortest distance Rayyan needs to travel so that he will get some paper and the magic pencil?

(A) $\sqrt{131}$ (B) $\sqrt{146}$ (C) $\sqrt{213}$ (D) $\sqrt{410}$ (E) NOTA

28. Vishnav needs to buy some chicken nuggets. However, McDonald's only sells in cartons of $6, 9$, and 20. What is the largest number that Vishnav cannot get through these cartons?

(A) 43 (B) 8 (C) 37 (D) 31 (E) NOTA

29. Find the sum of the distinct roots of the equation $(x-1)(x-2)(x-3)(x-4)\ldots(x-100) = 0$

(A) 5050 (B) 5150 (C) 0 (D) 4950 (E) NOTA

30. Tanvi really has to go to the bathroom right now. If she can wait for 2 more minutes, how many seconds can she wait for?

(A) 180 (B) 120 (C) 60 (D) 240 (E) NOTA