For all questions, answer choice (E) NOTA means that none of the given answers is correct. Every correct question is worth 5 points, every blank question is 1 point, and every wrong question is worth 0 points. Good Luck!

1. Winnie-the-Pooh wants to help his friend Tigger enjoy honey as much as he does. His favorite honey mixture combines 1001 cups of honey with 221 cups of water. He wants to give the same mixture to Tigger, but he only has 231 cups of honey left over, and he wants to keep the ratio of cups of honey to cups of water the same. How many cups of water should he add to the 231 cups of honey?

   (A) 48   (B) 49   (C) 50   (D) 51   (E) NOTA

2. Mulan is gearing up for battle, but she needs to choose two pairs of socks to take. She has 6 pairs of socks she can take, but she cannot take the Yin pair of socks without taking the Yang pair of socks, and vice versa (the Yin pair and Yang pair are part of the 6 pairs). How many ways can Mulan choose her socks?

   (A) 6   (B) 7   (C) 8   (D) 9   (E) NOTA

3. Mulan is late for training, and she mounts her horse quickly! Her horse travels at 10 miles per hour. If her training is 5 miles away, how many hours will it take for her to reach her training?

   (A) 0.5   (B) 1   (C) 2   (D) 4   (E) NOTA

4. Olaf cannot wait for Christmas! In Arendelle, it is currently midnight on November 16th, 2023. How many days will Olaf have to wait until midnight on Christmas, December 25th, 2023?

   (A) 33   (B) 35   (C) 37   (D) 39   (E) NOTA

5. Merida wants to shoot an arrow through the point $(2, 3)$. Which of the following arrow paths passes through this point?

   (A) $y = x + 2$ (B) $y = 2x$ (C) $y = -x + 6$ (D) $y = 3$ (E) NOTA

6. Scar is trying to judge his popularity among his kingdom. Out of the 30 animals he interviews, 6 of them say that he is doing a good job, and the rest say that he is doing a bad job. What percent of these animals say that he is doing a bad job?

   (A) 24% (B) 60% (C) 80% (D) 100% (E) NOTA

7. Moana is trying to go on another island adventure, but her parents will only let her once she finishes her math homework. Help her finish her math homework by finding the number of expressions that are quadratics in the following list:

$$x^2 + 2x + 1, 2x + 3, 3, 5x + 2x^2, 9x + 1$$

   (A) 1   (B) 2   (C) 3   (D) 4   (E) NOTA

8. Linguini is trying to replicate Remy's ratatouille. He know the amount of tomato sauce he needs is a function of the amount of people he is serving: $f(x) = x^2 + x + 1$, where x is people

and $f(x)$ is in cups. If Linguini is serving 3 people, how much tomato sauce does he need (in cups)?

(A) 9   (B) 10   (C) 12   (D) 13   (E) NOTA

9. Phineas is building another roller-coaster, and when he is selling tickets, he finds out that each time he reduces the ticket price by \$2, the amount of tickets sold increases by 50. He know that putting the price at \$5 per ticket will make him \$2000. How much money will he make if he sets the ticket price to \$1 per ticket?

(A) \$400   (B) \$500   (C) \$4000   (D) \$5000   (E) NOTA

10. Anna wants to build a snowman, but instead of making it with spheres, she wants to make it with cubes! She has cubes of side length 1, 2, 3, 4, 5, and 6 inches (one of each), and she wants to make the volume of the snowman 440 cubic inches. How many of the 6 cubes will she use?

(A) 2   (B) 3   (C) 4   (D) 5   (E) NOTA

11. Donald Duck is performing a magic trick! First, he tells you to pick a number. Next, add 12 to that number, and divide this result by 2. Now, multiply this result by 4 and subtract your original number from this result twice. What result will Donald claim that you have (and be right)?

(A) 24   (B) 20   (C) 16   (D) 12   (E) NOTA

12. Ralph is trying not to break the internet, and he has gotten into a new habit: racing! Ralph's car has the following features: when Ralph presses accelerate, it increases his speed by 1 mph every second, and when Ralph presses the brake, it decreases his speed by 2 mph every second. Ralph wants to increase his speed from 0 mph to 40 mph, and then decrease his speed from 40 mph to 20 mph. How much time (in seconds) will it take for him to do this?

(A) 30   (B) 40   (C) 50   (D) 60   (E) NOTA

13. Mickey is building a new house, and he wants it to be in the shape of a square. Which of the following numbers is not a perfect square?

(A) 326011   (B) 327184   (C) 328329   (D) 329476   (E) NOTA

14. When Peter Pan is bored, he likes factoring numbers in his free time. Which of the following numbers cannot be factored further (i.e. it is already prime)?

(A) 1001   (B) 1011   (C) 1071   (D) 1081   (E) NOTA

15. Simba has just started learning how to count, and he cannot comprehend numbers that are not integers. Help Simba by approximating $2000(\sqrt{2023} - \sqrt{2022})$ to the nearest integer.

(A) 16   (B) 22   (C) 28   (D) 34   (E) NOTA

16. Peter Pan is factoring numbers one day, when he stumbles across a difficult one: 10807. Help Peter find the number of positive integer divisors of 10807. (Hint: $1x^2 + 8x + 7 = (x+1)(x+7)$)

    (A) 4   (B) 6   (C) 8   (D) 12   (E) NOTA

17. Shang-Chi is obsessed with statistics. He has a list of 10 numbers, and these ten numbers have a mean of 12. He takes out two of the numbers and the mean of the remaining numbers drops to 7. What is the mean of the two numbers he took out?

    (A) 5   (B) 10   (C) 16   (D) 32   (E) NOTA

18. Tinker Bell has two coupons for buying pixie dust. One coupon says "15% off", while the other coupon says "$3 off". When she is buying some pixie dust, the cashier tells her that using either coupon would result in the same discount. How many dollars worth of pixie dust is Tinker Bell buying?

    (A) $15   (B) $16   (C) $18   (D) $20   (E) NOTA

19. Nemo was swimming in the ocean when he found $20.23 in quarters, dimes, nickels, and pennies. He notices that the number of coins of each type that he found were all distinct prime numbers! What is the minimum number of coins Nemo could have found?

    (A) 87   (B) 89   (C) 91   (D) 94   (E) NOTA

20. Luca loves solving linear equations, but while he was solving one, the water washed away one of the numbers! The equation now looks like $-x + 10 = 6x + \underline{\ \ }$. However, he remembers that his friend told him that the solution to this equation was an integer. Which of the following numbers cannot be the number in the blank?

    (A) 17   (B) 24   (C) 30   (D) 38   (E) NOTA

21. Aladin's magic carpet can travel at a speed of $\frac{12}{x}$ miles per hour if there are x people on the carpet. Aladin needs to travel from his house (alone) to Jasmine's castle, and then back to his house (with Jasmine). This journey takes 1 hour to complete. What is the distance between Aladin's house to Jasmine's castle, in miles?

    (A) 1   (B) 2   (C) 3   (D) 4   (E) NOTA

22. The journey in the previous question took so long that Aladin becomes bored along the journey and starts solving quadratics for fun. He notices that the quadratics $x^2 + 24x - 640$ and $x^2 + 34x - 800$ have a root in common. What is this root?

    (A) 12   (B) 15   (C) 20   (D) 24   (E) NOTA

23. Cruella has moved on from her Dalmatian obsession, and onto books! All of her books are about cooking and villainy. She has 1 book about both cooking and villainy, and this book represents 1% of all of her cooking books, and 2% of all of her villainy books. How many books does Cruella have in total?

    (A) 100   (B) 149   (C) 150   (D) 151   (E) NOTA

24. Cinderella's fairy godmother loves functions. In fact she loves them so much, she wants to combine them all of the time. Given the functions $f(x) = x^2 + x + 1$ and $g(x) = x + 1$, what is the value of $f(g(f(g(1))))$?

    (A) 22   (B) 49   (C) 61   (D) 73   (E) NOTA

25. The length of Pinocchio's nose can be represented as a function of time, $f(t) = -t^2 + 16t + 8$, where t is in seconds and $f(t)$ is in inches. What is the longest length of Pinocchio's nose, in feet?

    (A) 6   (B) 8   (C) 72   (D) 100   (E) NOTA

26. Ferb loves factorials! He loves them so much that he is competing in the annual Factorial Fair. To prepare him for the fair, Phineas asks him a complex question, "Which positive integer n satisfies $10! = n! \cdot 6!$?" What should Ferb answer?

    (A) 5   (B) 7   (C) 8   (D) 9   (E) NOTA

27. Woody's favorite sequence starts off as $2, 3, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 17, \ldots$. How many numbers from 1 to 100, inclusive, are in Woody's sequence?

    (A) 80   (B) 85   (C) 88   (D) 90   (E) NOTA

28. While Judy and Nick are fighting crime in Zootopia, they uncover a puzzle they have to solve to get a secret key to enter a villain's lair. The puzzle states "How many integers x satisfy the following inequality: $x^2 \le x + 12$?" Help Judy and Nick answer the puzzle!

    (A) 4   (B) 6   (C) 8   (D) 10   (E) NOTA

29. Hercules wants you to guess his favorite number. His favorite number H satisfies the following: there exists a function $f(x)$ such that $f(x^2) = 4x^2 + f(x) + Hx$. What is Hercules' favorite number?

    (A) 0   (B) -1   (C) -2   (D) Not enough info   (E) NOTA

30. Perry the Platypus wants to throw two boomerangs to catch Dr. Doof! His boomerangs are programmed to travel along the path of two parabolas, $y = x^2 + a$ and $x = y^2 + a$, after Perry chooses the value of a. Perry wants these two parabolas to only touch at one point. Help Perry by finding the value of a that he should choose to complete his goal!

    (A) 0.25   (B) 0.5   (C) 0.75   (D) 1   (E) NOTA