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

1. What is the least common multiple (LCM) of the numbers 6, 8, and 4?

   (A) 2   (B) 10   (C) 24   (D) 48   (E) NOTA

2. If $y = 13x + 18$, what is y when $x = 7$?.

   (A) 109   (B) 73   (C) 18   (D) 13   (E) NOTA

3. Rohith can run 30 miles in one hour (he is very athletic). How many miles could he run in 5 hours and 30 minutes, assuming he runs at the same constant rate?

   (A) 180   (B) 195   (C) 150   (D) 165   (E) NOTA

4. What is the slope of the line passing through the points $(4, 7)$ and $(-5, 8)$?

   (A) $-\dfrac{1}{9}$ (B) -9 (C) $\dfrac{1}{9}$ (D) 9   (E) NOTA

5. 50% of 60% of a certain number is 30. What is the number?

   (A) 120   (B) 100   (C) 80   (D) 90   (E) NOTA

6. Let the operation $a\#b$ be defined as $a\#b = ab + a + b$. What is $4\#7$?

   (A) 11   (B) 39   (C) 28   (D) 16   (E) NOTA

7. What is the sum of the integral factors of 42?

   (A) -42 (B) -96 (C) 0   (D) 96   (E) NOTA

8. Simplify $\dfrac{(4x^3y^2z)(5x^2z^6y^3)}{10xyz}$.

   (A) $2x^4y^4z^6$ (B) $2x^6y^6z^6$ (C) $20x^3y^4z^8$ (D) $20x^5y^5z^7$ (E) NOTA

9. What is the 12th prime number?

   (A) 29   (B) 31   (C) 37   (D) 41   (E) NOTA

10. Solve for x: $7x + 10 = 74 - x$

    (A) 5   (B) 6   (C) 7   (D) 8   (E) NOTA

11. Dave the Cow has been tied to a post with a rope that is exactly 10 feet long. Assuming he can walk anywhere that is not restricted by the rope, how much area can he cover (in ft^2)?

    (A) 25   (B) 25π (C) 100   (D) 100π (E) NOTA

12. Paul enjoys trolling. But because of his low test grades, his mom will not let him troll. Paul's current test grades are 68, 73, 76, and 65. His mom wants him to have a test average of 75 in order for Paul to be able to go trolling. What score does Paul need to get on his 5th test so that he can go trolling?

    (A) 88   (B) 93   (C) 95   (D) 98   (E) NOTA

13. Which of the following points is on the line $3x + 4y = 15$?

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

14. Keyura is going to the gym. Membership there costs 28 dollars a month. How many dollars does Keyura have to spend to go to the gym for the whole year? (She really needs to work out.)

    (A) 336   (B) 308   (C) 280   (D) 168   (E) NOTA

15. Let A be the set $\{10, 5, 9, 12\}$. Let X equal the mean of A and let Y equal the range of A. Find $X + Y - XY$.

    (A) 47   (B) -47 (C) -31 (D) -41 (E) NOTA

16. Puneet and 10 of his friends in the Rickards High School Mu Alpha Theta team are deciding on what AP classes they are going to take. Six of them are taking AP World History. Eight of them are taking AP Biology. How many of them are taking both courses if everyone must take at least one AP class?

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

17. Rohith wants to go running (yes, the guy who can run 30 miles an hour), but he needs a running outfit. He has 4 distinct options of special running shirts and 6 distinct options of special running shorts. If an outfit consists of 1 shirt and 1 shorts, how many different outfits can he make?

    (A) 10   (B) 20   (C) 16   (D) 28   (E) NOTA

18. Which of the following statements is true?

    (A) The slopes of two perpendicular lines are multiplicative inverses.
    (B) The slopes of two parallel lines are equal.
    (C) Parallel lines always intersect.
    (D) Perpendicular lines intersect at acute angles.
    (E) NOTA

19. If I am 6 feet tall and cast an 8 foot long shadow at a given time of day, how long in feet will the shadow be for a 15 foot tall statue at the same time?

    (A) 11.25   (B) 3.2   (C) 20   (D) 18   (E) NOTA

20. The point $(-4, 8)$ is translated up three units, to the right 5 units, down 6 units, and then left 2 units. In which quadrant is the new point located?

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

21. What are the values of x that make the inequality $-3x + 5 > 8$ true?

    (A) $x < -1$ (B) $x > -1$ (C) $x < 1$ (D) $x > 1$ (E) NOTA

22. Find the units digit of 1311^{332}.

    (A) 2   (B) 3   (C) 1   (D) 0   (E) NOTA

23. How many 4 digit numbers exist such that the thousands digit is an even number, the hundreds digit is two more than the tens digit, and the number is divisible by 5?

    (A) 32   (B) 64   (C) 40   (D) 80   (E) NOTA

24. What is the area of a circle with a diameter of 6?

    (A) 9   (B) 9π (C) 36   (D) 36π (E) NOTA

25. Faydra's age is currently twice Nisha's age. Four years ago, Faydra's age was three times Nisha's age. What is the sum of their current ages?

    (A) 16   (B) 24   (C) 8   (D) 20   (E) NOTA

26. What is the area of a square with a diagonal length of 8?

    (A) 32   (B) 64   (C) 16   (D) 24   (E) NOTA

27. Which property of the real numbers does this equation show?

$$A + (B + C) = (A + B) + C$$

    (A) Commutative Property of Addition
    (B) Distributive Property
    (C) Associative Property of Addition
    (D) Identity Property
    (E) NOTA

28. If it takes Puneet 3 hours to do a job and it takes Paul 6 hours to do the same job, how long in hours will it take them to do the job together assuming they work at a constant rate?

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

29. There are two buses placed apart at a distance of 500 miles. They begin heading toward each other, one at a constant speed of 60 miles per hour, and the other at a constant speed of 40 miles per hour. Starting at a bus is a fly that can fly 90 miles per hour. The fly flies back and forth between the fronts of the two buses. How many miles does the fly cover before it is squashed by the buses? Assume that the fly is able to make an instantaneous turnaround.

    (A) 540   (B) 360   (C) 450   (D) 500   (E) NOTA

30. You have a 20 ounce mixture that is 20% orange juice. How many ounces of pure orange juice would you need to add to this mixture to get a new mixture that is 50% orange juice?

    (A) 6   (B) 8   (C) 10   (D) 12   (E) NOTA