Remember, the choice NOTA means "None of the Aforementioned". Good luck and have fun!

1. Solve for x, if $5x + 24 = 3(x + 18)$.

   (A) -15 (B) 5 (C) 10 (D) 15 (E) NOTA

2. Evaluate $1 - 2 + 3 - 4 + 5 - 6 + \ldots + 2017 - 2018$.

   (A) -2018 (B) -1009 (C) 1009 (D) 2018 (E) NOTA

3. 2018 can be expressed as the product of two distinct prime numbers p_1 and p_2 with $p_1 > p_2$. Find $p_1 - p_2$.

   (A) 281 (B) 670 (C) 1007 (D) 2017 (E) NOTA

4. The slope of the line containing points $(5, x)$ and $(16, 19)$ is $-\frac{17}{4}$. What is x?

   (A) $\frac{187}{4}$ (B) $\frac{255}{4}$ (C) $\frac{263}{4}$ (D) $\frac{317}{11}$ (E) NOTA

5. What are the solutions to the equation $\sqrt{x+1} = x - 1$?

   (A) $x = 3$ (B) $x = 1, x = 4$ (C) $x = 0, x = 3$
   (D) $x = -1, x = -4$ (E) NOTA

6. A line passes through the point $(5, 6)$ and is also parallel to the x-axis. What is the equation of this line?

   (A) $x = 5$ (B) $y = \frac{6}{5}x$ (C) $y = 6$ (D) $y = -\frac{5}{6}x$ (E) NOTA

7. Simplify $\dfrac{\sqrt{6} + \sqrt{2}}{\sqrt{6} - \sqrt{2}}$.

   (A) $2 + \sqrt{3}$ (B) $2 - \sqrt{3}$ (C) $8 + 4\sqrt{3}$ (D) $8 - 4\sqrt{3}$ (E) NOTA

8. What is the value of $2018 \cdot 2017 - 2017 \cdot 2016 + 2018 \cdot 2016 - 2017^2$?

   (A) 4035 (B) 4034 (C) 4033 (D) -1 (E) NOTA

9. Donald is selling tickets for the annual Fall Festival at his school. Each adult ticket costs \$8, and each child ticket costs \$6. Given that he already sold 580 tickets and has received \$4078 dollars in return, how many child tickets did he sell already?

   (A) 263 (B) 281 (C) 287 (D) 299 (E) NOTA

10. Albert canoes upstream at an average rate of 10 km/h. He canoes downstream at an average rate of 24 km/h. Albert places a stick at the top of the same downward stream. At what speed does the stick travel? (Note: The stick cannot move by itself.)

    (A) 7 km/h (B) 9 km/h (C) 15 km/h (D) 17 km/h (E) NOTA

11. Joe and Jim finish a job in 30 hours. Jim and John finish the same job in 15 hours. Joe and John finish the same job in 12 hours. How long will it take John to do the same job alone?

(A) 40 (B) 60 (C) $\frac{120}{7}$ (D) 120 (E) NOTA

12. What is the value(s) of x that make the expression $\frac{x-8}{x^2-6x-16}$ undefined?

(A) $x = 0$ (B) $x = 2$ (C) $x = 2, x = -8$
(D) $x = -2, x = 8$ (E) NOTA

13. Find the units digit of $1^{2018} + 2^{2018} + 3^{2018} + \ldots + 2018^{2018}$.

(A) 3 (B) 5 (C) 7 (D) 9 (E) NOTA

14. Name the property that states "If $a > b$, then $b < a$."

(A) Transitive Property of Inequality
(B) Symmetric Property of Inequality
(C) Reflexive Property of Inequality
(D) Trichotomy Property of Inequality
(E) NOTA

15. How many integral values of x satisfy the inequality $|3x - \frac{7}{4}| < 49$?

(A) 34 (B) 33 (C) 32 (D) 31 (E) NOTA

16. Simplify without using negative exponents, for $x \neq 0$, $y \neq 0$, and $z \neq 0$: $\frac{(2x^2y^5z^3)^2(x^5yz^2)}{5x^7y^4z^5}$.

(A) $\frac{4x^2y^7z^3}{5}$ (B) $\frac{4x^2y^4z^2}{5}$ (C) $\frac{8x^2y^4z^2}{5}$ (D) $\frac{2x^5y^3z^2}{5}$ (E) NOTA

17. Rationalize the denominator of $\frac{26}{2\sqrt{3}-5}$.

(A) $-52\sqrt{3} - 130$ (B) $-52\sqrt{3} + 130$ (C) $-4\sqrt{3} + 10$
(D) $-4\sqrt{3} - 10$ (E) NOTA

18. There exist functions $f(x) = 2x + 1$ and $g(x) = 4x^2 + 4x + 8$. What is $f^{-1}(g(f^{-1}(g(0))))$?

(A) 143 (B) 35 (C) $\frac{49}{2}$ (D) 17 (E) NOTA

19. Find the sum of the x-intercepts of the equation $y = 5x^2 + 49x + 72$.

(A) $\frac{49}{5}$ (B) $-\frac{72}{5}$ (C) $\frac{72}{5}$ (D) $\frac{121}{5}$ (E) NOTA

20. At how many points do the graphs of $y = x^2 + 5x + 7$ and $y = x^3 - 2x^2 + 8x + 6$ intersect?

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

21. What is the abscissa of the intersection of the lines $2x + y = 5$ and $x + 3y = 0$?

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

22. The function $f(x) = x^2$ is transformed such that it results in the function $f(x) = 3(x-5)^2+7$. What is a possible order of transformations?

(A) reflected across the line $y = -2.5$, vertically dilated by a factor of 3 about its vertex, then translated 7 units up
(B) reflected across the line $x = 2.5$, vertically dilated by a factor of 3 about its vertex, then translated 7 units up
(C) translated 5 units left, vertically dilated by a factor of 3 about its vertex, then translated 7 units up
(D) translated 5 units down, vertically dilated by a factor of 3 about its vertex, then translated 7 units right
(E) NOTA

23. If $x + \frac{1}{x} = 4$, what is $x^6 + \frac{1}{x^6}$?

(A) 1024 (B) 2702 (C) 4096 (D) 140452 (E) NOTA

24. For what value of k does the system of equations

$$y = kx + 4$$

$$5x + 6y = 20$$

have no solutions?

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

25. One more than a number is x. One more than another number is $2x$. The product of both numbers is equal to the sum of both numbers. What is the product of the sum and product of both numbers?

(A) $\frac{9}{4}$ (B) $-\frac{9}{4}$ (C) $\frac{9}{2}$ (D) 9 (E) NOTA

26. How many positive integer ordered pairs (x, y) satisfy the equation $\frac{1}{x} + \frac{1}{y} = \frac{1}{8}$?

(A) 4 (B) 5 (C) 6 (D) 7 (E) NOTA

27. If $5^x + 5^{x+3} = 3^x + 3^{x+5}$, then what is $\frac{5^x}{3^x}$?

(A) $\frac{5}{3}$ (B) $\frac{3125}{27}$ (C) $\frac{122}{63}$ (D) $\frac{243}{125}$ (E) NOTA

28. Let $f(x)$ be a function such that $f(1) = 1$ and $f(x + 1) = x \cdot f(x)$. Which of the following is equivalent to $f(2018)$?

(A) 2016! (B) 2017! (C) 2018! (D) 2019! (E) NOTA

29. Find the value of α such that the equation $3^x\alpha + 3^{x+2}(1 - \alpha) = 3^{x+1}$ holds for all real x.

(A) $\frac{1}{3}$ (B) $\frac{1}{2}$ (C) $\frac{2}{3}$ (D) $\frac{3}{4}$ (E) NOTA

30. How many distinct values can be obtained by inserting parentheses into the expression

$$\underbrace{1-1-1-1-\ldots-1}_{\text{2018 1s}}$$

if parentheses cannot be used for multiplication? For example, $1-(1-(1-1))$ would be valid for four 1's, but $1-1(-1-1)$ would not.

(A) 2016 (B) 2017 (C) 2018 (D) 2019 (E) NOTA