Choice E, "NOTA", means "none of these answers".

1. Find the product of the coordinates of the point at which the lines $2x + 3y = 8$ and $5x + 2y = -2$ intersect.

A) -8 B) -4 C) 8 D) 40 E) NOTA

2. What is the equation of the line that contains the point (20, -17) and has undefined slope?

A) $y = -17$ B) $20x - 17y = 0$ C) $x = 20$ D) $x = 0$ E) NOTA

3. Given the equation $\frac{1}{x^2-2x-3} = \frac{A}{x-3} + \frac{B}{x+1}$, where A and B are real, find the value of the product AB.

A) 1 B) -2/3 C) 3/2 D) -1/16 E) NOTA

4. Given $x^2 + y^2 \leq 3$ with x and y both integers, how many ordered pairs (x, y) satisfy this inequality?

A) 4 B) 6 C) 7 D) 8 E) NOTA

5. Given $y = 2^{x+2} - (2^{x+1} + 2^x)$, which of the following is an equivalent expression for y ?

A) 2^{-x+1} B) $\frac{2^{x+2}}{2^{2x+1}}$ C) 2^x D) $\frac{1}{2^{x+1}}$ E) NOTA

6. Given that $\sqrt{9+4\sqrt{5}} = \sqrt{x} + \sqrt{y}$, with x and y both positive rational numbers and $x < y$, find the value of the expression $3x - y$.

A) 7 B) 17 C) 20 D) no solution E) NOTA

7. Find the distance between the foci of $4x^2 + 9y^2 + 24x - 72y + 144 = 0$.

A) 1 B) $2\sqrt{2}$ C) $2\sqrt{5}$ D) 4 E) NOTA

8. What is the x-intercept of the perpendicular bisector of the segment with endpoints (5, -2) and (-7, -6)?

A) -7 B) $-\frac{7}{3}$ C) $-\frac{11}{3}$ D) 11 E) NOTA

9. Given that $x + y = 11$ and $x^2 + y^2 = 325$, find the value of the expression $x^3 + y^3$.

A) 2,453 B) 3,575 C) 4,697 D) 5,113 E) NOTA

10. What is the greatest integer contained in the solution set of $-3(x-2)-x(x-3)<-x^2-2x-8$?

A) 0 B) -6 C) -7 D) -8 E) NOTA

11. Consider the polynomial equation of least degree with coefficients that are relatively prime integers. The known roots of this equation are $2+i$, $-3/2$, and i. Find the coefficient of the quadratic term of this equation in expanded form.

A) 16 B) 15 C) 10 D) -5 E) NOTA

12. Solve for x $\frac{x^2-2x-3}{x-1}\geq 0$ and express the solution in interval notation.

A) $[3,\infty)$ B) $(-\infty,-1]\cup(1,3)$ C) $(-1,1)\cup(3,\infty)$ D) $[-1,1)\cup[3,\infty)$ E) NOTA

13. What is the sum of the integral solutions of $|4x-5|\leq x+8$?

A) 10 B) 6 C) 53/20 D) infinite E) NOTA

14. Which matrix equation is not equivalent to the system $\begin{matrix}5x+2y=-3\\4x-3y=7\end{matrix}$?

A) $\begin{bmatrix}5x\\4x\end{bmatrix}+\begin{bmatrix}2y\\-3y\end{bmatrix}=\begin{bmatrix}-3\\7\end{bmatrix}$ B) $\begin{bmatrix}-3&4\\2&5\end{bmatrix}\cdot\begin{bmatrix}y\\x\end{bmatrix}=\begin{bmatrix}7\\-3\end{bmatrix}$ C) $\begin{bmatrix}5&2\\4&-3\end{bmatrix}\cdot\begin{bmatrix}x\\y\end{bmatrix}=\begin{bmatrix}-3\\7\end{bmatrix}$ D) $\begin{bmatrix}5x+2y\\4x-3y\end{bmatrix}=\begin{bmatrix}-3\\7\end{bmatrix}$ E) NOTA

15. Find the equation of the line tangent to the circle $x^2+y^2+2x-4y=15$ at the point (3, 4).

A) $2x+y=5$ B) $2x+y=10$ C) $x-2y=5$ D) $x-2y=-5$ E) NOTA

16. Find the area of the region bounded by the intersection of the graphs of $x\leq 3$ and $\frac{(x-3)^2}{16}+\frac{(y+2)^2}{4}\leq 1$.

A) 32π B) 8π C) 4π D) π E) NOTA

17. What is the minimum value of the function $f(x)=3x^2+24x+35$?

A) -13 B) -8 C) -4 D) 179 E) NOTA

18. If $f(x) = 2017^x$, then $f(x+1) - f(x)$ is equivalent to which of the following?

A) 2017^x B) $2017^x - 2017$ C) 2016^{x+1} D) $2016(2017)^x$ E) NOTA

19. What is the product of the solutions of the equation $x^{\log x} = 100x$?

A) -10 B) -2 C) 10 D) 100 E) NOTA

20. Which if the following is the inverse of the function $f(x) = 3x + 5$?

A) $f^{-1}(x) = \frac{x+5}{3}$ B) $f^{-1}(x) = \frac{x-5}{3}$ C) $f^{-1}(x) = \frac{x-3}{5}$ D) $f^{-1}(x) = \frac{5-x}{3}$ E) NOTA

21. Find the value of the sum of the two intertwined geometric series given by $\frac{5}{2} - \frac{1}{3} + 1 + \frac{2}{9} + \frac{2}{5} - \frac{4}{27} + \ldots$

A) $\frac{983}{270}$ B) $\frac{19}{6}$ C) $\frac{13}{10}$ D) $\frac{119}{30}$ E) NOTA

22. The Davis family has 5 children. It is known that at least 3 of the children are boys. What is the probability that there are 3 boys and 2 girls?

A) $\frac{1}{3}$ B) $\frac{1}{4}$ C) $\frac{5}{8}$ D) $\frac{5}{16}$ E) NOTA

23. Suppose the value of an antique chair varies inversely with the number of such chairs that still exist. If 1,200 exist, each chair has a value of $420. How much would each chair be worth if only 75 still exist?

A) $6,720 B) $13,440 C) $19,200 D) $20,160 E) NOTA

24. The zeros of the function $f(x) = x^3 + 2nx^2 - nx + 10$ are integers and form an arithmetic sequence. Find the value of $f(-3)$.

A) -100 B) -80 C) -8 D) 8 E) NOTA

25. Let k = the constant term of the expansion of $\left(2x^2 - \frac{1}{x}\right)^9$. What is the value of k?

A) 8 B) 168 C) 448 D) 672 E) NOTA

26. If $A = \begin{bmatrix} 2 & -1 \\ -4 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & 0 \\ 2 & -2 \end{bmatrix}$, find the sum of the elements of the product $(A^{-1})(B^2)$.

A) 51 B) 45 C) 22.5 D) -7.5 E) NOTA

27. Which of the following is the sum of the *y*-intercepts of the asymptotes of $4x^2 - 24x - y^2 - 4y + 41 = 0$?

A) 12 B) 4 C) -4 D) -12 E) NOTA

28. Consider the function $R(x) = \dfrac{2x^2 + x - 6}{x^2 - 3x - 10}$. What is the length of the segment whose endpoints are the point of removable discontinuity of $R(x)$ and the intersection point of the horizontal and vertical asymptotes of $R(x)$?

A) $5\sqrt{2}$ B) $\sqrt{10}$ C) $4\sqrt{2}$ D) 4 E) NOTA

29. Solve for *x* over the set of Reals: $\left(e^{\ln(x-1)}\right)\left(\ln e^{(x+5)}\right) = 3(\ln e) + e^{2(\ln 2)}$

A) 2 B) 3 C) 5 D) 6 E) NOTA

30. Find the sum of the solutions of $\sqrt{2x+6} - \sqrt{x+4} = 1$ over the set of Real numbers.

A) 5 B) 2 C) -2 D) $\varnothing$ E) NOTA