For all questions, answer choice "E) NOTA" means none of the above answers is correct.

1. Find the equation of the line perpendicular to $3x-2y=5$ containing the point $(-2,3)$.

A) $3x-2y=-12$ B) $2x-3y=-19$ C) $2x+3y=5$ D) $3x+2y=0$ E) NOTA

2. Find the area of $\triangle ABC$ with vertices $A(-1,4)$, $B(2,5)$, and $C(4,-3)$.

A) 31 B) 21 C) 18 D) 13 E) NOTA

3. For $f(x)=ax^2-bx+c$, if $f(2)=3$ and $x=-3$ is a zero of the function, find $a+b$.

A) $-\frac{3}{5}$ B) $\frac{3}{2}$ C) $-\frac{2}{3}$ D) $\frac{5}{3}$ E) NOTA

4. Find the x-value of the ordered pair of the intersection of $y=|x-1|-3$ and $y=2x-1$.

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

5. Given $f(x)=x^2-x-1$ and $g(x)=2f(x)-3f(x-1)$, find $g(3)-f(1)$.

A) 31 B) 27 C) 28 D) 6 E) NOTA

6. Let $A=$ the sum of the solutions to the equation $9\left(3^{x^2-2x}\right)=3^{4-x}$, and let $B=$ the sum of the solutions to the equation $2^{3y-1}=4^{y^2}$. Find the value of the product AB.

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

7. If $\sqrt{3+\sqrt{3+\sqrt{3+\ldots}}}-\sqrt{2+\sqrt{2+\sqrt{2+\ldots}}}$ can be written in the form $\frac{a+\sqrt{b}}{c}$, where a, b, and c are relatively prime integers and b is not divisible by the square of any integer, find the value of $a+b-c$.

A) 1 B) 5 C) 8 D) 16 E) NOTA

8. If three fair dimes are tossed, what are the odds that 2 heads and 1 tail are shown?

A) 5:3 B) 3:5 C) 3:8 D) 5:8 E) NOTA

9. Which of the following is the inverse of $f(x)=\frac{x-1}{x+2}$?

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

10. What is the minimum value of the function $f(x)=2x^2-5x-8$?

A) -8 B) -10.375 C) -11.125 D) -12 E) NOTA

11. Solve the equation $\log_a 3-\log_a b=c$ for b.

A) $b=c/3a$ B) $b=3/a^c$ C) $b=a/3c$ D) $b=a^{3c}$ E) NOTA

12. The following table gives some values of $f(x)$ and $f^{-1}(x)$. What is the value of $a+b$?

x	0	1	2	3	4	5	?
$f(x)$	5	3	?	a	?	4	8
$f^{-1}(x)$	2	4	3	b	?	?	8

A) 3 B) 4 C) 5 D) 6 E) NOTA

13. How many distinct permutations of the letters A, B, C, and D exist?

A) 6 B) 12 C) 20 D) 24 E) NOTA

14. Find the value of the following: $\sum_{c=2}^{7}\frac{1}{c+1}-\sum_{c=2}^{7}\frac{1}{c-1}$

A) $-23/27$ B) $-69/56$ C) $15/56$ D) $-61/56$ E) NOTA

15. The area of a rectangle remains unchanged when side A is made 2.5 units longer and side B is made $2/3$ units narrower OR when side A is made 2.5 units shorter and side B is made $4/3$ units wider. Find the area of the rectangle.

A) 10 B) 20 C) 40 D) 50 E) NOTA

16. Joe is trying to solve a quadratic equation, but parts of the equation are missing. He knows that the sum of the roots is the same as that of the equation $2x^2-3x-5=0$ and the product of the roots is the same as that of the equation $3x^2+x-3=0$. Which of the following is one solution to Joe's equation?

A) 0.5 B) -2 C) -0.25 D) 2 E) NOTA

17. Find the value of $\sqrt[3]{27-54b+36b^2-8b^3}$ if $b=4$.

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

18. Suppose f is a quadratic function for which $f(0)=4, f(1)=5,$ and $f(-1)=f(0)+f(1)$. Find the value of $f(5)$.

A) 69 B) 89 C) 93 D) 98 E) NOTA

19. Let $A=$ the radius of the circle with equation $9x^2+9y^2-54x+36y=-101$, and let $B=$ the length of the major axis of the ellipse with equation $25x^2+9y^2+100x-90y=-100$, find the value of $3A-2B$.

A) -8 B) -16 C) -5 D) 1 E) NOTA

20. Find the number of lattice points in the region defined by $y>0, x>0, 2x-y<8,$ and $4x+5y<30$.

A) 17 B) 16 C) 15 D) 14 E) NOTA

21. If $z=x+yi$, then $z\bar{z}+(-3+4i)\bar{z}+(-3-4i)z=0$ is the equation of a circle, where $\bar{z}$ is the complex conjugate of z. Find the coordinates of the center of the circle.

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

22. Which of the following is the domain of the inverse of the function $f(x)=3x^2-4x-3$, $x\geq 3$?

A) $[12,\infty)$ B) $(-\infty,\infty)$ C) $(-\infty,3]$ D) $\left[-13/3,\infty\right)$ E) NOTA

23. Given that $\frac{3i}{i+3}-\frac{i}{i-3}=a-bi$, where a and b are real numbers, find the value of $a+b$.

A) -1 B) $7/5$ C) $7/10$ D) 1 E) NOTA

24. The solution to the equation $\log_8(x+1)-\log_8(x-1)=2/3$ can be written in the form a/b, where a and b are relatively prime positive integers. Find the value of a^b.

A) 8 B) 243 C) 125 D) 256 E) NOTA

25. Find the product AB^{-1} if $A=\begin{bmatrix}-1 & 3\\ 2 & 5\\ 0 & -4\end{bmatrix}$ and $B=\begin{bmatrix}2 & 5\\ -2 & -4\end{bmatrix}$.

A) $\begin{bmatrix}10 & 1\\ 2 & 20\\ 8 & -8\end{bmatrix}$ B) $\begin{bmatrix}8.5 & 7\\ 10.5 & 8\\ -10 & -6\end{bmatrix}$ C) $\begin{bmatrix}-1 & 0.5\\ -9 & 10\\ 4 & -4\end{bmatrix}$ D) $\begin{bmatrix}5 & 5.5\\ 1 & 0\\ -4 & -4\end{bmatrix}$ E) NOTA

26. Find the solutions set of the inequality $\frac{x-2}{x-3}\le 2$.

A) $(-\infty,3]\cup[4,\infty)$ B) $(3,4]$ C) $(-\infty,3)\cup(4,\infty)$ D) $[4,\infty)$ E) NOTA

27. Circles O and P intersect at points G and H. The radii of O and P have lengths of 5 and 6, respectively, and $\left|\overline{OP}\right|=7$. Find the length of $\overline{GH}$.

A) $\frac{12\sqrt{6}}{7}$ B) $\frac{8\sqrt{3}}{7}$ C) $\frac{12\sqrt{42}}{7}$ D) $\frac{24\sqrt{6}}{7}$ E) NOTA

28. Find the largest value of x for which $\begin{vmatrix}-2 & 4 & 0\\ 3 & x & 3\\ -1 & 1 & 5\end{vmatrix}=7x^2-74$

A) 2 B) $-4/7$ C) $4/7$ D) -2 E) NOTA

29. The degree measure of the smaller acute angle of a right triangle is equal to the sum of the squares of the roots of $x^2 - 7x + 5 = 0$. Find the degree measure of the larger acute angle.

A) 69° B) 64° C) 57° D) 51° E) NOTA

30. Find the value of k such that the parabolas $y = 3x^2 + 16x + k$ and $y = -2x^2 - 4x + 6$ intersect in exactly one point.

A) 26 B) 24 C) 6 D) -12 E) NOTA