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

1. What is the discriminant of $2x^2+4=5x$?

   A. $\sqrt{-7}$ B. -7 C. $\sqrt{57}$ D. 57 E. NOTA

2. Simplify $\log_2\left(\sqrt[5]{4\sqrt{2}}\right)$.

   A. -1 B. 0 C. $\frac{1}{2}$ D. 2 E. NOTA

3. If two factors of $2x^2-hx+k$ are $x+2$ and $x-1$, find the value of $2h-3k$.

   A. -16 B. 0 C. 8 D. 16 E. NOTA

4. If $xy=6, yz=20,$ and $xz=30,$ find the value of $\left|\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right|$, where $x, y, z \neq 0$.

   A. $\frac{11}{60}$ B. $\frac{13}{60}$ C. $\frac{14}{15}$ D. $\frac{3}{4}$ E. NOTA

5. Find the smaller ordinate of the foci of $\frac{(x-2)^2}{16}+\frac{(y-1)^2}{41}=1$.

   A. -4 B. -1 C. 1 D. 2 E. NOTA

6. If $\frac{\sqrt{10}}{\sqrt{10}-\sqrt{5}}$ is transformed to an expression with a rational denominator,

   the result would be:

   A. $\frac{2+\sqrt{2}}{5}$ B. $2+\sqrt{2}$ C. $\frac{\sqrt{10}}{5}$ D. $\sqrt{2}$ E. NOTA

7. When x^2+3x+b is divided by $x+a$, the quotient is $x-2$ and the remainder is 7.

   Find the value of $b-a$.

   A. -8 B. -2 C. 2 D. 8 E. NOTA

8. Find the product of the roots of $\frac{y+3}{3-y}+\frac{3y+1}{y^2-9}=\frac{1-5y}{y+3}$.

A. $-\frac{5}{4}$ B. $-\frac{4}{5}$ C. 4 ¾ D. 5 E. NOTA

9. If $\log_{10} m = b - \log_{10} n,$ then $m =$

A. $\frac{b}{n}$ B. bn C. $10^b n$ D. $\frac{10^b}{n}$ E. NOTA

10. If $f(a)=a-2$ and $g(a,b)=a^2+b,$ then find the value of $g(2,f(-2))$.

A. -2 B. 0 C. 2 D. 4 E. NOTA

11. Find the abscissa of the intersection of $y=\frac{8}{x^2+4}$ and $x+y=2$.

A. $-2+\sqrt{5}$ B. $-2-\sqrt{5}$ C. 0 D. 2 E. NOTA

12. Which of the following is NOT a term in the polynomial which is the product of $(x+1)(3x^2+6x),$ and $(2x^2+6x-1)$?

A. $6x^5$ B. $36x^4$ C. $63x^3$ D. $-6x$ E. NOTA

13. Find the value of $x+y$ for the system $\begin{cases} x^{-1}-3y^{-1}=5 \\ 2x^{-1}+y^{-1}=-4 \end{cases}$.

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

14. Solve for the sum of the absolute values of x for $\begin{vmatrix} x & 2 & 1 \\ 3 & x & 0 \\ 1 & 0 & 1 \end{vmatrix}=6$.

A. 0 B. 1 C. 3 D. 7 E. NOTA

15. Find the absolute value of the difference of the roots : $x^{\frac{1}{2}}+4x^{\frac{-1}{2}}=5$.

A. 4 B. 8 C. 12 D. 15 E. NOTA

16. If the ratio of $(2x-y)$ to $(x+y)$ is 2 to 3, find the ratio of x to y.

A. $\frac{1}{5}$ B. $\frac{4}{3}$ C. $\frac{5}{4}$ D. $\frac{6}{5}$ E. NOTA

17. If $\sqrt{x+2}=2$, then find the value of $(x+2)^2$.

A. $\sqrt{2}$ B. 2 C. 4 D. 16 E. NOTA

18. If $(\log_3 x)(\log_x 2x)(\log_{2x} y)=\log_x x^2$, $x>0, y>0$, then find the value of y.

A. $\frac{9}{2}$ B. 9 C. 18 D. 27 E. NOTA

19. The solution of $7^{x+1}=5$ is

A. $\log_5 7+1$ B. $\log_5 7-1$ C. $\log_7 5-1$ D. $\log_7 5+1$ E. NOTA

20. Find the sum of the quotient and remainder when $x^4+x^3+x^2+3x+7$ is divided by x^2+3x+4.

A. x^2-2 B. x^2+8 C. x^2-2x+3 D. x^2+4x-2 E. NOTA

21. Simplify the expression for $a\neq 0, x\neq 0$: $\left(\frac{a}{x}-\frac{x}{a}\right)\left[\left(\frac{a+x}{a-x}\right)^2-1\right]$

A. $\frac{4(a-x)}{a+x}$ B. $\frac{4(a+x)}{a-x}$ C. $\frac{a-4}{4(a+x)}$ D. $\frac{a+x}{4(a-x)}$ E. NOTA

22. Determine the sum of a and b so that i is a root of $5x^4-3x^3+ax^2+bx-7=0$.

A. -5 B. -1 C. 1 D. 5 E. NOTA

23. Find the value of $\frac{3^{-1}+4^{-1}}{5^{-1}}$.

A. 12 B. $\frac{35}{12}$ C. $\frac{7}{5}$ D. $\frac{5}{7}$ E. NOTA

24. Find the axis of symmetry for the parabola $y=\frac{2}{3}x^2+3x+5$.

A. $x=-\frac{9}{2}$ B. $x=-\frac{9}{4}$ C. $x=-\frac{3}{2}$ D. $x=-\frac{2}{3}$ E. NOTA

25. Find the sum of the real solutions for $\sqrt{2x+7}-\sqrt{x+3}=1$.

A. -3 B. -2 C. 1 D. no solutions E. NOTA

26. Let $f(x)=x^2+1$ and $g(x)=\sqrt{x-2}$. Find the value of $(f\circ g)(4)$.

A. 3 B. $\sqrt{15}$ C. $17\sqrt{2}$ D. 34 E. NOTA

27. Find the average of the y-coordinates of the points at which the graphs of $x^2+y^2=16$ and $y=x^2-4$ coincide.

A. -2 B. 0 C. $\frac{2}{3}$ D. 2 E. NOTA

28. Simplify $(x+y)^2-(x-y)^2+(x^2-y^2)-(x^2+y^2)$

A. 0 B. $2y(2x-y)$ C. $2y^2$ D. $-2y^2$ E. NOTA

29. If $x^4-1=80$, then x^3+x^2+x+1 could equal

A. -80 B. -60 C. -40 D. -20 E. NOTA

30. For what values of x is the inequality $\frac{3x}{2x-4}<\frac{1}{1-x}$ true?

A. $x>\frac{4}{3}$ or $x<-1$ B. $-1<x<\frac{4}{3}$

C. $x<-1$ or $1<x<\frac{4}{3}$ or $x>2$ D. $-1<x<1$ or $\frac{4}{3}<x<2$ E. NOTA