Assignment

Properties of Logarithms

Basic Level

1. $\log ab - \log |b| =$

(a) $\log a$ (b) $\log |a|$ (c) $-\log a$ (d) None of these

2. The value of $\sqrt{(\log_{0.5}^2 4)}$ is

(a) –2 (b) $\sqrt{(-4)}$ (c) 2 (d) None of these

3. The value of $\log_3 4 \log_4 5 \log_5 6 \log_6 7 \log_7 8 \log_8 9$ is **[IIIT Allahabad 2000]**

(a) 1 (b) 2 (c) 3 (d) 4

4. $\log_7 \log_7 \sqrt{7(\sqrt{7\sqrt{7}})} =$

(a) $3\log_2 7$ (b) $1 - 3\log_3 7$ (c) $1 - 3\log_7 2$ (d) None of these

5. The value of $81^{(1/\log_5 3)} + 27^{\log_9 36} + 3^{4/\log_7 9}$ is equal to

(a) 49 (b) 625 (c) 216 (d) 890

6. $7\log\left(\frac{16}{15}\right) + 5\log\left(\frac{25}{24}\right) + 3\log\left(\frac{81}{80}\right)$ is equal to **[EAMCET 1990]**

(a) 0 (b) 1 (c) $\log 2$ (d) $\log 3$

7. If $\log_4 5 = a$ and $\log_5 6 = b$, then $\log_3 2$ is equal to

(a) $\frac{1}{2a+1}$ (b) $\frac{1}{2b+1}$ (c) $2ab+1$ (d) $\frac{1}{2ab-1}$

8. If $\log_k x . \log_5 k = \log_x 5, k \neq 1, k > 0$, then x is equal to

(a) k (b) $\frac{1}{5}$ (c) 5 (d) None of these

9. If $\log_5 a . \log_a x = 2$, then x is equal to

(a) 125 (b) a^2 (c) 25 (d) None of these

10. If $a^2 + 4b^2 = 12ab$, then $\log(a + 2b)$ is

(a) $\frac{1}{2}[\log a + \log b - \log 2]$ (b) $\log\frac{a}{2} + \log\frac{b}{2} + \log 2$ (c) $\frac{1}{2}[\log a + \log b + 4\log 2]$ (d) $\frac{1}{2}[\log a - \log b + 4\log 2]$

11. If $A = \log_2 \log_2 \log_4 256 + 2\log_{\sqrt{2}} 2$, then A is equal to **[WB JEE 1992]**

(a) 2 (b) 3 (c) 5 (d) 7

12. If $\log_{10} x = y$, then $\log_{1000} x^2$ is equal to

(a) y^2 (b) $2y$ (c) $\frac{3y}{2}$ (d) $\frac{2y}{3}$

13. If $x=\log_a(bc), y=\log_b(ca), z=\log_c(ab)$, then which of the following is equal to 1

(a) $x+y+z$ (b) $(1+x)^{-1}+(1+y)^{-1}+(1+z)^{-1}$ (c) xyz (d) None of these

14. If $a=\log_{24}12, b=\log_{36}24$ and $c=\log_{48}36$, then 1+*abc* is equal to

(a) $2ab$ (b) $2ac$ (c) $2bc$ (d) 0

15. If $a^x=b, b^y=c, c^z=a$, then value of *xyz* is

(a) 0 (b) 1 (c) 2 (d) 3

16. If $\log x:\log y:\log z=(y-z):(z-x):(x-y)$ then

(a) $x^y.y^z.z^x=1$ (b) $x^x y^y z^z=1$ (c) $\sqrt[x]{x}\sqrt[y]{y}\sqrt[z]{z}=1$ (d) None of these

17. $\log_4 2-\log_8 2+\log_{16}2-....\text{to }\infty$ is **[MNR 1994; Roorkee 1994; MP PET 2000]**

(a) e^2 (b) $\ln 2+1$ (c) $\ln 2-1$ (d) $1-\ln 2$

18. If $\log_{10}2=0.30103, \log_{10}3=0.47712$, the number of digits in $3^{12}\times 2^8$ is

(a) 7 (b) 8 (c) 9 (d) 10

19. $\sum_{r=1}^{89}\log_3(\tan r^o)$

(a) 3 (b) 1 (c) 2 (d) 0

20. $\sum_{n=1}^{n}\frac{1}{\log_{2^n}(a)}=$

(a) $\frac{n(n+1)}{2}\log_a 2$ (b) $\frac{n(n+1)}{2}\log_2 a$ (c) $\frac{(n+1)^2 n^2}{4}\log_2 a$ (d) None of these

21. Which of the following is not true

(a) $\log(1+x)<x$ for $x>0$ (b) $\frac{x}{1+x}<\log(1+x)$ for $x>0$ (c) $e^x>1+x$ for $x>0$ (d) $e^x<1-x$ for $x>0$

22. The solution of the equation $\log_7\log_5(\sqrt{x^2+5+x})=0$ **[UPSEAT 2000 (S.E.)]**

(a) $x=2$ (b) $x=3$ (c) $x=4$ (d) $x=-2$

Advance

23. $\log_4 18$ is

(a) A rational number (b) An irrational number (c) A prime number (d) None of these

24. The value of $(0.05)^{\log_{\sqrt{20}}(0.1+0.01+0.001+......)}$ is

(a) 81 (b) $\frac{1}{81}$ (c) 20 (d) $\frac{1}{20}$

25. If *a, b, c* are distinct positive numbers, each different from 1, such that

$[\log_b a\log_c a-\log_a a]+[\log_a b\log_c b-\log_b b]+[\log_a c\log_b c-\log_c c]=0$, then $abc=$

(a) 1 (b) 2 (c) 3 (d) None of these

26. If $\log_{12} 27 = a$, then $\log_6 16 =$ **[EAMCET 1990]**

(a) $2.\frac{3-a}{3+a}$ (b) $3.\frac{3-a}{3+a}$ (c) $4.\frac{3-a}{3+a}$ (d) None of these

27. If $n = 1983!$, then the value of expression $\frac{1}{\log_2 n}+\frac{1}{\log_3 n}+\frac{1}{\log_4 n}+.......+\frac{1}{\log_{1983} n}$ is equal to

(a) –1 (b) 0 (c) 1 (d) 2

28. If $\frac{\log x}{b-c}=\frac{\log y}{c-a}=\frac{\log z}{a-b}$, then which of the following is true

(a) $xyz = 1$ (b) $x^a y^b z^c = 1$ (c) $x^{b+c}y^{c+a}z^{a+b} = 1$ (d) $xyz = x^a y^b z^c$

29. If $x_n > x_{n-1} > ... > x_2 > x_1 > 1$ then the value of $\log_{x_1} \log_{x_2} \log_{x_3} ..... \log_{x_n} x_n^{x_{n-1}^{\cdot^{\cdot^{x_1}}}}$ is equal to

(a) 0 (b) 1 (c) 2 (d) None of these

30. The number of solution of $\log_2(x+5) = 6 - x$ is

(a) 2 (b) 0 (c) 3 (d) None of these

31. The number of real values of the parameter k for which $(\log_{16} x)^2 - \log_{16} x + \log_{16} k = 0$ with real coefficients will have exactly one solution is

(a) 2 (b) 1 (c) 4 (d) None of these

32. If $x^{\frac{3}{4}(\log_3 x)^2 + \log_3 x - \frac{5}{4}} = \sqrt{3}$ then x has

(a) One positive integral value (b) One irrational value

(c) Two positive rational values (d) None of these

Logarithmic Inequalities

Basic Level

33. If $x = \log_5(1000)$ and $y = \log_7(2058)$ then

(a) $x > y$ (b) $x < y$ (c) $x = y$ (d) None of these

34. The number $\log_{20} 3$ lies in

(a) $\left(\frac{1}{4},\frac{1}{3}\right)$ (b) $\left(\frac{1}{3},\frac{1}{2}\right)$ (c) $\left(\frac{1}{2},\frac{3}{4}\right)$ (d) $\left(\frac{3}{4},\frac{4}{5}\right)$

35. If $\frac{1}{\log_3 \pi}+\frac{1}{\log_4 \pi} > x$, then x be

(a) 2 (b) 3 (c) 3.5 (d) π

36. If $\log_{1/\sqrt{2}} \sin x > 0, x \in [0, 4\pi]$, then the number of values of x which are integral multiples of $\frac{\pi}{4}$, is

(a) 4 (b) 12 (c) 3 (d) None of these

37. The set of real values of x satisfying $\log_{1/2}(x^2 - 6x + 12) \ge -2$ is

(a) $(-\infty, 2]$ (b) $[2, 4]$ (c) $[4, +\infty)$ (d) None of these

38. The set of real values of x for which $2^{\log_{\sqrt{2}}(x-1)} > x + 5$ is

(a) $(-\infty,-1)\cup(4,+\infty)$ (b) $(4,+\infty)$ (c) $(-1,4)$ (d) None of these

Advance

39. Solution set of inequality $\log_{10}(x^2-2x-2)\le 0$ is

(a) $[-1,1-\sqrt{3}]$ (b) $[1+\sqrt{3},3]$ (c) $[-1,1-\sqrt{3})\cup(1+\sqrt{3},3]$ (d) None of these

40. If $\frac{1}{2}\le \log_{0.1} x \le 2$ then........

(a) The maximum value of x is $\frac{1}{\sqrt{10}}$ (b) x lies between $\frac{1}{100}$ and $\frac{1}{\sqrt{10}}$

(c) x does not lie between $\frac{1}{100}$ and $\frac{1}{\sqrt{10}}$ (d) The minimum value of x is $\frac{1}{100}$

41. If $\log_{0.04}(x-1)\ge \log_{0.2}(x-1)$ then x belongs to the interval

(a) $(1,\ 2]$ (b) $(-\infty, 2]$ (c) $[2,+\infty)$ (d) None of these

42. The set of real values of x for which $\log_{0.2}\frac{x+2}{x}\le 1$ is

(a) $\left(-\infty,\ -\frac{5}{2}\right]\cup(0,+\infty)$ (b) $\left[\frac{5}{2},+\infty\right)$ (c) $(-\infty,-2)\cup(0,+\infty)$ (d) None of these

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