MATHS

BOOKS - PEARSON IIT JEE FOUNDATION

LOGARITHMS

Example

1. If $x^2 + y^2 = 3xy$ then choose the correct answer of 2log (x - y) form the following option :

A. logx- logy

B. logx + logy

C. log(xy)

D. both(b) and (c)

Answer: B

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2. Choose the correct answer answer from the following option for : $[\log_4\{\log_3(\log_3 27)\}] =$

(A) 0 (B) 1 (c) $\log_2 3$ (D) undefined

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3. If log2= 0,301 , then the find the number of digital in 2^{1024} from the following options.

(A) 307 (B) 308 (C) 309 (D) 310

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4. Express -0,52e29 in the standard form and locate it on the number line.

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5. compare : log 25, log 250 and log0.025

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6. compare : log 2.56, log0.256 and log 25600

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7. Find the value of log2.556 and log 25.460

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8. To find the antilog of 1.301 .

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9. To find the antilog of 2.3246.

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10. Find the value of $\frac{5.431 \times 0.061}{12.38 \times 0.041}$ to four significant digits.

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11. If $\log_{10} 3 = 0.4771$ and $\log_{10} 2 = 0.3010$ find the value of $\log_{10} 48$

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Very Short Answer

1. $\log_x A^n$ = _____

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2. Expand $\log_3 \left(\frac{xy^2}{z^3} \right)$

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3. Can we write $\frac{\log_x a}{b} as \frac{\log_x a}{\log_x b}$?

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4. Express 0.001 = $(0.1)^3$ in the logarithmic form

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5. $2\log_s 2$ = _____

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6. $\log_5 2 + \log_5 20 - \log_5 8 =$ _____

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7. The value of $\frac{3 + \log_{10}(10)^2}{\log_5 5}$ is _____

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8. $\log_x ab = (\log_x a) \times (\log_x b)$. State true of False.

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9. If $\log_{10} 2 = 0.3010$, then $\log_{10} 2000 =$

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10. Evaluate 3 - $\log_{10} 100$

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11. Given 3= $\log_2 x + 4 \log_2 8$. Then the value of x=_____

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12. If $\log_{10} 2 = 0.3010$, then $\log_{10} 5$= _____

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13. If x= $\log_5 3$ and $y = \log_5 8$ then $\log_5 24$ in terms of x,y is equal to _____

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14. if $\log_{16} 25 = k \log_2 5$then k = _____

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15. If 5 log3 + log x = 5log6 , then k = _____

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16. if logx= $\left(\frac{\log_a x}{\log_a x}\right)^k$, then k =_____

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17. if $a >$ and $m > n$ then which is greater , $\log_a m($ or $)\log_a n$?

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18. if 2logx + 2log y = k and xy =1, then k = _____

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19. if log 198.9 = 2.2987 , then the characteristic of log 198.9= and mantissa of log 198.9 = _____

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20. When $a > 1$ and $m > n$, then which is greater , $\log_a m$(or)$\log_a n$?

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21. Given $\log_{10} x = y$ if the characteristic of y is 10, then the number of digits to the left the decimal point in x is _____

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22. find the value of $\log_{\sqrt{8}} 16$

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23. $\log_x x \times \log_y y \times \log_z z =$ _____

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24. if the characteristics of the logarithm of two numbers acbd.abef and a .bcdabef are x and y respectively, then x-y= _____

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25. If log2= 0.3010 , log3 = 0.4771 and log 7 = 0.8451 then find the values of log105.

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26. Given antilog (2.375) =x Characteristic of log x is _____

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27. if log (21.73) = 1.3371 , then find the values of log (2.173)

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28. If antilog (0.2156) = 1.643, then find the values of antilog (1.2156)

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29. wihout using the logarithm tables find the value of $3\log_3 27$

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30. find the value of $\log_{0.6}\left(\frac{9}{25}\right)$

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Short Answer Type Questions

1. Prove that log5040 = 4log2 + 2log3 + log5 + log7

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2. find the value of $\log_{2-1}(0.0625)$

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3. Express the following as a single logarithm.

$$\frac{1}{3}\log x - \frac{8}{5}\log y + \frac{7}{2}\log z$$

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4. if $x^2 + y^2 = 25$ xy then prove that 2log(x+y) = 3log 3 + log x + logy.

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5. if $x^2 + y^2 = z^2$ then prove that $\log_y(z + x) + \log_y(z - x) = 2$

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6. Prove that $\log_2\left[\log_4\left\{\log_5 (625)^4\right\}\right] = 1$

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7. if $\log_{10} 2 = 0.3010$, then find the number of digits in $(16)^{10}$

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8. If log2= 0.3010, log3= 0.4771 and log 7 = 0.8451 then find the value of log 75.

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9. if $x^4 + y^4 = 83x^2y^2$ then prove that $\log\left(\frac{x^2 - y^2}{9}\right)$ = logx + logy.

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10. prove that

$$2\frac{\log 35}{192} + 2\frac{\log 114}{91} + \log 48 + 21\log\left(\frac{13}{19}\right) = \log\left(\frac{75}{64}\right).$$

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11. solve for x:

logx + log5 = 2+ log 64

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12. if $x^4 - y^4 - x^2y^2 - 2xy^3 = z^6$ then prove that $\log_z\left(x^2 - y^2 - xy\right) + \log_z\left(x^2 + y^2 + xy\right) = 6$

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13. Find the value of $\sqrt[4]{(32)^8}$

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14. Find the value of $\sqrt[3]{[0.12^3]}$

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15. Given log 3= 0.4771 ,then the number of digits in 3^{1000} is

_____

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Essay Type Questions

1. if $\log_{x+1} 2x - 1 + \log_{2x-1} x + 1 = 2$ find x.

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2. If $a = b^{1/3} = c^{1/5} = d^{1/7} = e^{1/9}$ find $\log_a abcde$.

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3. Arrange th following in ascending order.

$A = \log_9 6561 B = \log_{\sqrt{5}} 625\ C = \log_{\sqrt{3}} 243 D = \log_{\sqrt{2}} 256$

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4. If $\log_y x - \log_{y^3} x^2 = 9(\log_x y)^2$ and $x = 9y$ find y.

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5.

$$\log\left(\frac{a^2}{b}\right)+\log\left(\frac{a^4}{b^3}\right)+\log\left(\frac{a^6}{b^3}\right)+\ldots\ldots+\log\left(\frac{a^{2n}}{b^n}\right)=?$$

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Level 1

1. $\log_{y(x)} \times \log_x y =$_____.

A. $\log_a y$

B. $\log_x a$

C. $\log_y a$

D. $\log_a x$

Answer: B

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2. if log x= 123.242 , then the characteristic of log x is

A. 0.242

B. 122

C. 123

D. 124

Answer: C

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3. Pick up the false statement.

Logarithms are defind only for positive real numbers.

(B) $\log_a N$ is always unique.

© the for from of $2^3 = 8 is 3 = \log_8 2$

(D) log1=0

A. B

B. C

C. D

D. A

Answer: B

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4. $\log\left(\frac{169}{9}\right) - 2\log 13 + 2\log 3 = ?$

A. 1

B. 0

C. $\log\left(\frac{13}{3}\right)$

D. $\log\left(\frac{x}{yz}\right)$

Answer: B

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5. $\log_{z^2}(x^2y^2)$ =?

A. 2(logx + logy - logz)

B. logx +logy - logz

C. $\frac{\log x^2 = \log y}{\log z}$

D. $\frac{\log x + \log y}{\log z}$

Answer: D

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6. If $x^3 - y^2 = 3xy(x - y)$ then $\log(x - y)^3$= _____

A. 0

B. 1

C. Undefined

D. None of these

Answer: C

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7. $\log\left(a^3+b^3\right)-\log(a+b)-\log\left(a^2-ab+b^2\right)$ =_____

A. a^3-b^3

B. 0

C. log 1

D. Both (b) and ©

Answer: D

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8. which is greatest among the following :

A. $\log_2 20$

B. $\log_7 35$

C. $\log_5 70$

D. $\log_3 68$

Answer: A

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9. `log (a+b) + log (a-b) - log (a^(2) -b^(2))=_____

A. 0

B. 1

C. $\left(a^2 - b^2\right)$

D. $a^2 + b^2$

Answer: A

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10. if $x^3 + y^3 = -3xy(x+y)$. the $\log(x+y)^3$ = _____

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11. if $\frac{\log x}{\log y} = \frac{\log 49}{\log 7}$, then the relation between x and y.

A. $x = \sqrt{y}$

B. $x = y^3$

C. $y = x^2$

D. $x = y^2$

Answer: D

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12. log(x) -log(2x-3)=1 then x = ?

A. $\frac{30}{19}$

B. $\frac{20}{19}$

C. $\frac{19}{30}$

D. $\frac{19}{20}$

Answer: A

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13. If 2log(x+4) = log 16, then x=?

A. 0,-8

B. -8

C. -2

D. 0

Answer: D

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14. the value of x when $\log_x 343 = 3$,is

A. 7

B. 8

C. 3

D. 27

Answer: A

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15. $\log_{16} 3.\ \log_{17} 4,\ \log_9 17$=_____

A. $\frac{1}{2}$

B. $\frac{1}{4}$

C. $\frac{1}{8}$

D. $\frac{2}{3}$

Answer: B

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16. $\log_2[\log_2\{\log_2(\log_3 81)\}] =$

A. 1

B. 0

C. log 3

D. Undefined

Answer: B

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17. $\log_{11} 3.\ \log_3 1331 =$____

A. 3

B. 11

C. 121

D. 9

Answer: A

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18. $\log_{121}\left(\frac{\sqrt{14641}}{121}\right)$ = ____

A. 11

B. 121

C. 0

D. 1

Answer: C

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19. $\frac{\log_3 729 + \log_6 216}{4 + \log_2 16 - 2\log_4 64}$ = ------

A. 9

B. 4

C. $\frac{9}{2}$

D. $\frac{1}{2}$

Answer: C

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20. The value of $\log_{x^n} y^m$ is

A. $\frac{m}{n}$

B. mn

C. m^n

D. n^m

Answer: A

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21. $\log_y x = 2$ then $a \log_a(\log_x y)$= _____

A. -2

B. 4

C. $\frac{1}{2}$

D. $\frac{-1}{4}$

Answer: C

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22. if p= $\log_6 216$ and $q = \log_3 27$ then p^q= _____

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23. $2^{16 - \log_2 1024}$ = _____

A. 16

B. 32

C. 64

D. 8

Answer: C

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24. $2^{3\log_2 2} - 3^{2\log_3 2} =$ _____

A. 8

B. 4

C. 9

D. 2

Answer: B

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25. $\log_{a+b}\left(a^3+b^3\right)-\log_{a+b}\left(a^2-ab+b^2\right)=$ _____

A. $\log_{a+b}-(a-b)$

B. 2

C. a+b

D. 2

Answer: D

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26. $16^{\log_{16} 25} =$ _____

A. 25

B. 5

C. 16

D. 4

Answer: B

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27. $\dfrac{1}{\log_{xy} x + \log_{xy} y} =$ _____ ?

A. 1

B. 2

C. 0

D. $\frac{1}{\log_{xy} x \times \log_{xy} y}$

Answer: D

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28. if $y = = \log_{x-3}\left(x^2 - 6x + 9\right)$,then find y.

A. 4

B. 8

C. 2

D. 32

Answer: C

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Level 2 Mcq

1. If $\log_{10} 2 = 0.3010$, then the number of digits in 16^{12} is

A. 14

B. 15

C. 13

D. 16

Answer: B

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2. if $\log_{64} P^2 = 1\frac{2}{3}$ then $\frac{\log_2 p}{16}$ = _____

A. 16

B. 2

C. 32

D. 1

Answer: D

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3. $\log_2 \log_9 \log_5 125$= _____

A. 4

B. 8

C. -1

D. 1

Answer: C

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4. If $\log_x y = \frac{\log_a y}{P}$ then the value of P is

A. $\log_y x$

B. $\log_x a$

C. $\log_a x$

D. $\log_a y$

Answer: C

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5. $\log\left[\frac{\sqrt[3]{x^2} \times y}{\sqrt[5]{z^2}}\right]$ =_____

A. $\log x^{2/3} - \log z^{2/5} + \log y$

B. $\log x^{3/2} - \log y - \log z^{5/2}$

C. $\log x^{2/3} - \log y + \log z^{2/5}$

D. None of these

Answer: A

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6. if $\log[4 - 5\log_{32}(x+3)] = 0$ find x

A. 32

B. 8

C. 3

D. 5

Answer: D

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7. If x $= \log_3 \log_2 \log_2 256$, then $2^{\log_4 2^{2^x}}$ = _____

A. 4

B. 8

C. 2

D. 1

Answer: C

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8. if $\log_a\left(\frac{13^2}{\sqrt{2^3}\times 5}\right) = 2\log_a 13 - \log_a 5 - x$ then

A. $a^x = 2^{3/2}$

B. $x^a = 2^{3/2}$

C. $a^x = 2^{2/3}$

D. $x^a = 2^{2/3}$

Answer: A

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9. If log81 = loga then $4(\log_9 a)$= _____

A. 4

B. 16

C. 2

D. 8

Answer: D

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10. if $a^{\log_a} = 3\text{then}\ \ a^{\log b} + b^{\log a}$= _____

A. 6

B. 9

C. 3

D. Cannot be determined

Answer: A

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11. if $\log_3(x-5)+\log_3(x+2)=\log_3 8$ then x = _____

A. -3

B. 6

C. 6,-3

D. 3,-6

Answer: B

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12. if log (x+y) = log x + log y , then x= ____

A. $\frac{-y}{1=y}$

B. $\frac{y}{y-1}$

C. 1

D. $\frac{y}{1+y}$

Answer: B

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13. If $2^{\log 5}.5^{\log 2} = 2^{\log x}$ then $\log_5 \sqrt[3]{x^2}$= _____

A. $\frac{4}{3}$

B. $\frac{3}{4}$

C. $\frac{1}{3}$

D. 3

Answer: A

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14. If $3^{\log x} + x^{\log 3} = 54$ find log x.

A. 3

B. 2

C. 4

D. Cannot be determined

Answer: A

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15. if logx - logy = 1 and x+y = 11 ` then x = _____

A. 10

B. 1

C. 11

D. 2

Answer: A

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16. if $\log_{49} 3 \times \log_9 7 \times \log_2 8 = x$ then find the value of $\frac{4x}{3}$

A. 3

B. 7

C. 8

D. 1

Answer: D

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17. the value of $\log_{a-b}\left(a^3 - b^3\right) - \log_{a-b}\left(a^2 + ab + b^2\right)$ is _____ . $(a > b)$

A. 0

B. 1

C. 3

D. Undefined

Answer: B

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18. If $\log_3 2 = x$ then the value of $\frac{\log_{10} 72}{\log_{10} 24}$ is

A. $\frac{1+x}{1-x}$

B. $\frac{2+3x}{1+3x}$

C. $\frac{2-3x}{2+3x}$

D. Undefined

Answer: B

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19. $\log\left(\frac{1}{2}\right) + \log\left(\frac{2}{3}\right) + \log\left(\frac{3}{4}\right) + \ldots. + \log\left(\frac{99}{100}\right) =$

_____

A. -2

B. -1

C. 0

D. 2

Answer: A

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20. If $x^2 - y^2 = 1, (x > y)$,then find the value of $\log(x-y)(x+y)$

A. -2

B. 2

C. -1

D. 1

Answer: C

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21. If $3^{\log_3(5)} + 5^{\log_x 3} = 8$ then find the value of x.

A. 3

B. 5

C. 4

D. 8

Answer: B

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22. $\log_2 1.\log_3 2.\log_4)3.\log_5 4.\log_6 5.\ldots\ldots\log_{200} 199$ =

_____

A. ∞

B. 0

C. 1

D. Cannot be determined

Answer: B

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23. If $x^2 + y^2 - 3xy = 0$ and $x > y$ then find the value of $\log_{xy}(x-y)^2$

A. $\frac{1}{4}$

B. 4

C. $\frac{1}{2}$

D. 2

Answer: C

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24. If log3= 0.4771, then find the number of digits in 3^{100}

A. 47

B. 48

C. 49

D. 50

Answer: B

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Level 3 Mcq

1. If $\log_5 x - \log_5 y = \log_5 4 + \log_5 2$ and $x - y = 7$, then =

_____ .

A. 1

B. 8

C. 7

D. 6

Answer: B

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2. If $\log_2\left[-1+\sqrt{x^2-14x+49}\right]=4$, then x= _____

A. 24

B. -10

C. 24,-10

D. 10

Answer: C

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3. if $\frac{\log P}{2} = \frac{\log_q}{4} = \frac{\log r}{8} = knadpqr = 100,$ then k = _____

A. 14

B. $\frac{1}{6}$

C. $\frac{1}{7}$

D. 2

Answer: C

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4. If $\log 2 = 0.3010,$ and $\log 3 = 0.4771$ then log 150 = _____

A. 2.1761

B. 2.8751

C. 2.5762

D. 2.6126

Answer: A

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5. If $\log_{10} 2 = 0.3010$ and $\log_{10} 3 = 0.4771$, then the value of $\log_{10}\left(\frac{2^3 \times 3^2}{5^2}\right)$ is

A. 0.4592

B. 0.5492

C. 0.4529

D. 0.5429

Answer: A

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6. The value of $\frac{1}{1+\log_{ab} c}+\frac{1}{1+\log_{ac} b}+\frac{1}{1+\log_{bc} a}$ equals

A. 2

B. 0

C. 1

D. log abc

Answer: A

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7. if $x^2 + y^2 = z^2$, then $\frac{1}{\log_{z+x} y} + \frac{1}{\log_{z-x} y}$ = _____

A. 4

B. 3

C. 2

D. 1

Answer: C

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8. If log2 = 0.301 then find the number of digits in 2^{1024}.

A. 307

B. 308

C. 309

D. 310

Answer: C

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9. If $x^2 - y^2 = 1, (x > y)$ then find the value of $\log_{x-y}(x + y)$

A. -2

B. 2

C. -1

D. 1

Answer: C

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10. If $x^2 + y^2 - 3xy = 0$ and $x > y$ then find the value of $\log_{xy}(x - y)$.

A. $\frac{1}{4}$

B. 4

C. $\frac{1}{2}$

D. 2

Answer: C

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11. if $2^{\log_3 9} + 25\log_9 3 = 8\log_x 9$then x= _____

A. 9

B. 8

C. 3

D. 2

Answer: B

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12. If $\log_a x = m$ and $\log_b x = n$ then $\log_{\frac{a}{b}} x$= _____

A. $\frac{m}{m-n}$

B. $\frac{mn}{m-n}$

C. $\frac{n}{m-n}$

D. (mn)/(n-m)`

Answer: D

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13. $\frac{\log_5 6}{\log_5 2 + 1}$=

A. $\log_2 6$

B. $\log_2 5$

C. $\log_{10} 6$

D. $\log_{10} 30$

Answer: C

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14. If x = $\log_3 27$ and $y = \log_9 27$ then $\frac{1}{x} + \frac{1}{y}$ = _____

A. $\frac{1}{3}$

B. $\frac{1}{9}$

C. 3

D. 1

Answer: D

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15. If $\log_6 x + 2\log_{36} x + 3\log_{216} x = 9$ then x = _____

A. 6

B. 36

C. 216

D. None of these

Answer: C

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