Logarithm-Exercise Questions updated on Dec 2024

1.If $a^x = b^y$, then

a.log a/b= x/y  b.log a/ log b = x/y  c.log a/ log b = y/x  d.log b/a = x/y

2.2 $\log_{10} 5 + \log_{10} 8 - \frac{1}{2} \log_{10} 4$ = ?

a.2  b.4  c.2 + 2 $\log_{10} 2$  d.4 - 4 $\log_{10} 2$

3.$\log_a (ab) = x$, then $\log_b (ab)$ is :

a.1/x  b.x/ (x+1)  c.x/(1-x)  d.x/(x-1)

4.If $\log_8 x + \log_8 1/6 = 1/3$, then the value of x is:

a.12  b.16  c.18  d.24

5.The value of ($\log_9 27 + \log_8 32$) is:

a.7/2  b.19/6  c.5/3  d.7

6.If $\log_{12} 27 = a$, then $\log_6 16$ is:

a.(3-a)/4(3+a)  b.(3+a)/4(3-a)  c.4(3+a)/(3-a)  d.4(3-a)/(3+a)

7.The value of ($1/\log_3 60 + 1/\log_4 60 + 1/\log_5 60$) is:

a.0  b.1  c.5  d.60

8.If log x + log y = log (x+y),then,

a.x=y  b.xy=1  c.y= (x-1)/x  d.y=x/(x-1)

9.If log 27= 1.431, then the value of log 9 is:

a.0.934  b.0.945  c.0.954  d.0.958

10.If log 2= 0.030103, the number of digits in $2^{64}$ is :

a.18  b.19  c.20  d.21

**Answer & Explanations**

1.(c). $a^x = b^y$ => $\log a^x = \log b^y$ => $x \log a = y \log b$

=> $\log a / \log b = y/x$

2.(a). $2 \log_{10} 5 + \log_{10} 8 – ½ \log_{10} 4$

= $\log_{10} (5^2) + \log_{10} 8 - \log_{10} (4^{1/2})$

= $\log_{10} 25 + \log_{10} 8 - \log_{10} 2 = \log_{10} (25*8)/2$

= $\log_{10} 100 = 2$

3.(d). $\log_a (ab) = x$ => $\log b / \log a = x$ => $(\log a + \log b)/ \log a = x$

$1+ (\log b/ \log a) = x$ => $\log b/ \log a = x-1$

$\log a/ \log b = 1/ (x-1)$ => $1+ (\log a/ \log b) = 1 + 1/ (x-1)$

$(\log b/ \log b) + (\log a/ \log b) = x/ (x-1)$ => $(\log b + \log a)/ \log b = x/ (x-1)$

=>$\log (ab)/ \log b = x/(x-1)$ => $\log_b (ab) = x/(x-1)$

4.(a). $\log_8 x + \log_8 (1/6) = 1/3$

=> $(\log x/ \log 8) + (\log {}^1/_6 / \log 8) = \log (8^{1/3}) = \log 2$

=> $\log x = \log 2 – \log 1/6 = \log (2*6/1) = \log 12$

5.(c). Let $\log_9 27 = x$. Then, $9^x = 27$

=> $(3^2)^x = 3^3$ => $2x = 3$ => $x= 3/2$

Let $\log_8 32 = y$. Then

$8^y = 32$ => $(2^3)^y = 2^5$ => $3y = 5$ => $y=5/3$

6.(d). $\log_{12} 27 = a$ => $\log 27/ \log 12 = a$

=> $\log 3^3 / \log (3 * 2^2) = a$

=> $3 \log 3 / \log 3 + 2 \log 2 = a$ => $(\log 3 + 2 \log 2)/ 3 \log 3 = 1/a$

=> $(\log 3/ 3 \log 3) + (2 \log 2/ 3 \log 3) = 1/3$

=> $(2 \log 2)/ (3 \log 3) = 1/a – 1/3 = (3-a)/ 3a$

=> $\log 2/ \log 3= (3-a)/3a$ => $\log 3 = (2a/3-a)\log 2$

$\log_{16} 16 = \log 16/ \log 6 = \log 2^4/ \log (2*3) = 4 \log 2/ (\log 2 + \log 3)$

= 4(3-a)/ (3+a)

7.(b). $\log_{60} 3 + \log_{60} 4 + \log_{60} 5 + \log_{60} (3*4*5)$

$= \log_{60} 60 = 1$

8.(d). log x + log y = log (x+y)

=> log (x+y) = log (xy)

=> x+y = xy => y(x-1) = x

=> y= x/(x-1)

9.(c). log 27 = 1.431 => $\log 3^3 = 1.431$

=> 3 log 3= 1.431 => log 3 = 0.477

Therefore, $\log 9 = \log 3^2 = 2 \log 3 = (2*0.477) = 0.954$

10.(c). $\log 2^{64} = 64 \log 2 = (64*0.30103) = 1926592$

Its characteristics is 19.

Hence, the number of digits in $2^{64}$ is 20.