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classmate
Date
Page

WEEK 3 (APTITUDE)

[LOGARITHM]

(1) If $\log 2 = 0.3010$ & $\log 3 = 0.4771$, the value of $\log_5 512$ is :—

a) 2.870
b) 2.967
c) 3.876
d) 3.912

Solution $\Rightarrow \log_5 512 = \frac{\log 512}{\log 5} = \frac{\log 2^9}{\log(10/2)}$

$= \frac{9\log 2}{\log 10 - \log 2} = \frac{9 \times 0.3010}{1 - 0.3010} = \frac{2.709}{0.699}$

$= \boxed{3.876}$

(2) $\frac{\log \sqrt{8}}{\log 8}$ is equal to :

a) $1/\sqrt{8}$
b) 1/4
c) 1/2
d) 1/8

Solution $\frac{\log \sqrt{8}}{\log 8} = \frac{\log (8)^{1/2}}{\log 8}$

$= \boxed{\frac{1}{2}}$

③ If $\log 27 = 1.431$, then the value of $\log 9$ is :-

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

Solution

$$\log 27 = \log (3)^3 = 3\log 3 = 1.431$$

$$\Rightarrow \log 3 = \frac{1.431}{3}$$

$$\log 9 = \log 3^2 = 2\log 3 = \frac{2 \times 1.431}{3} = \boxed{0.954}$$

④ If $\log\left(\frac{a}{b}\right) + \log\left(\frac{b}{a}\right) = \log(a+b)$, then :

a) $a+b=1$
b) $a-b=1$
c) $a=b$
d) $a^2-b^2=1$

Solution $\log\left(\frac{a}{b}\right) + \log\left(\frac{b}{a}\right) = \log(a+b)$

$$\Rightarrow \log\left(\frac{a}{b} \times \frac{b}{a}\right) = \log(a+b) \Rightarrow \boxed{a+b=1}$$

(5) If $\log_{10} 7 = a$, then $\log_{10}\left(\frac{1}{70}\right)$ is equal to:

a) $-(1+a)$
b) $(1+a)^{-1}$
c) $a/10$
d) $\frac{1}{10a}$

Solution $\log_{10}\left(\frac{1}{70}\right) = \log_{10}(1) - \log_{10}(70)$

$= 0 - [\log_{10}(7) + \log_{10}(10)]$

$= \boxed{-(a+1)}$

(6) If $\log_{10} 2 = 0.3010$, then $\log_2 10$ is equal to:

a) $699/301$
b) $\frac{1000}{301}$
c) 0.3010
d) 0.6990

Solution

$$\log_2 10 = \frac{1}{\log_{10} 2} = \frac{1}{0.3010} = \boxed{\frac{1000}{301}}$$

(7) If $\log_{10}5 + \log_{10}(5x+1) = \log_{10}(x+5) + 1$ then x is equal to:

a) 1 c) 5

b) 3 d) 10

Solution

$\Rightarrow \log_{10}5 + \log_{10}(5x+1) = \log_{10}(x+5) + \log_{10}10$

$\Rightarrow \log_{10}(5 \times (5x+1)) = \log_{10}(10(x+5))$

$\Rightarrow 25x+5 = 10x+50 \Rightarrow 15x = 45 \Rightarrow \boxed{x=3}$

(8) The value of $\left(\frac{1}{\log_3 60} + \frac{1}{\log_4 60} + \frac{1}{\log_5 60}\right)$ is:

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

Solution $\Rightarrow \log_{60}3 + \log_{60}4 + \log_{60}5$

$\Rightarrow \log_{60}(3 \times 4 \times 5) = \log_{60}(60) = \boxed{1}$

(9) If $\log 2 = 0.30103$, then no. of digits in 2^{64} is:

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

Solution

$$\log(2^{64}) = 64 \times \log 2 = 64 \times 0.30103$$

$$= 19.26592 \simeq 19.$$

$\therefore$ No. of digits = 20

(10) If $\log_x\left(\frac{9}{16}\right) = \frac{-1}{2}$, then x is equal to:

a) $\frac{-3}{4}$ b) $\frac{3}{4}$ c) $\frac{81}{256}$ d) $\frac{256}{81}$

Solution

$$x^{-1/2} = \frac{9}{16} \Rightarrow \frac{1}{\sqrt{x}} = \frac{9}{16}$$

$$\sqrt{x} = \frac{16}{9} \Rightarrow \boxed{x = \frac{256}{81}}$$