

Exercise 3.2

Q.1 Find the common logarithms of each of the following numbers.

(i) 232.92

Solution: 232.92

Suppose $x = 232.92$

Taking log

$\log x = \log 232.92$

$Ch = 2$

Mantissa = 0.3672

$\log x = 2.3672$ **Ans**

(ii) 29.326

Solution: 29.326

Suppose $x = 29.326$

Taking log

$\log x = \log 29.326$

$Ch = 1$

Mantissa = 0.4672

$\log x = 1.4672$ **Ans**

(iii) 0.00032

Solution: 0.00032

Suppose $x = 0.00032$

Taking log

$\log x = \log 0.00032$

$Ch = \bar{4}$

Mantissa = 0.5051

$\log x = \bar{4}.5051$ **Ans**

(iv) 0.3206

Solution: 0.3206

Suppose $x = 0.3206$

Taking log:

$\log x = \log 0.3206$

$Ch = \bar{1}$

Mantissa = 0.5059

$\log x = \bar{1}.5059$ **Ans**

Q.2 If $\log 31.09 = 1.4926$, find the value of the following.

If

$\log 31.09 = 1.4926$

Then

(i) $\log 3.109 = 0.4926$

(ii) $\log 310.9 = 2.4926$

(iii) $\log 0.003109 = \bar{3}.4926$

(iv) $0.3109 = \bar{1}.4926$

Solution:

(i) $\log 3.109$

Characteristics = 0

Mantissa = 0.4926

$\log 3.109 = 0.4926$ **Ans**

(ii) $\log 310.9$

Characteristics = 2

Mantissa = 0.4926

$\log 310.9 = 2.4926$ **Ans**

(iii) $\log 0.003109$

Characteristics = $\bar{3}$

Mantissa = 0.4926

$\log 0.003109 = \bar{3}.4926$ **Ans**

(iv) $\log 0.3109$

Characteristics = $\bar{1}$

Mantissa = 0.4926

$\log 0.3109 = \bar{1}.4926$ **Ans**

Q.3 Find the numbers whose common logarithms are

(i) 3.5621

Solution:

$\log x = 3.5621$

$Ch = 3$ (If ch is positive, then plus for reference point)

Mantissa = 0.5621

$x = \text{antilog } 3.5621$

$x = 3649.0$ **Ans**

(ii) $\bar{1}.7427$

Solution:

$\log x = \bar{1}.7427$

$Ch = \bar{1}$

Mantissa = 0.7427

$x = \text{anti log } \bar{1}.7427$

$x = 0.5530$ **Ans**

Q.4 What replacement for the unknown in each of the following will make the true statements?

(i) $\log_3 81 = L$

Solution: $\log_3 81 = L$

Writing in exponential form.

$3^L = 81$

$3^L = 3^4$

\therefore Bases are equal so

$L = 4$ **Ans**

(ii) $\log_a 6 = 0.5$

Solution: $\log_a 6 = 0.5$

$a^{0.5} = 6$

$a^{\frac{1}{2}} = 6$

$\sqrt{a} = 6$ Taking square on both

sides

$\sqrt{(a)}^2 = (6)^2$

$a = 36$ **Ans**

(iii) $\log_5 n = 2$

Write in exponential form

$5^2 = n$

$25 = n$

Or $n = 25$ **Ans**

(iv) $10^P = 40$

Solution: $10^P = 40$

Changing into logarithmic form

$P = \log_{10} 40$

$= \log 40$

$= 1.6021$ **Ans**

Q.5 Evaluate.

(i) $\log_2 \frac{1}{128}$

Solution: $\log_2 \frac{1}{128}$

Suppose $\log_2 \frac{1}{128} = x$

Writing in exponential form.

$2^x = \frac{1}{128}$

$2^x = \frac{1}{2^7}$

$2^x = 2^{-7}$

\therefore Bases are equal so

$x = -7$ **Ans**

(ii) **log 512 to the base $2\sqrt{2}$**

Solution: $\log_{2\sqrt{2}} 512 = x$

Writing in exponential form

$(2\sqrt{2})^x = 512$

$(2^1 \cdot 2^{\frac{1}{2}})^x = 2^9$

$(2^{\frac{3}{2}})^x = 2^9$

$2^{\frac{3}{2}x} = 2^9$

\therefore Bases are equal so

$\frac{3}{2}x = 9$

$x = \frac{9 \times 2}{3}$

$x = \frac{18}{3}$

$x = 6$ **Ans**

Q.6 Find the value of x from the following statements.

(i) $\log_2 x = 5$

Solution: $\log_2 x = 5$

Write in exponential form.

$2^5 = x$

$32 = x$ **Ans**

(ii) $\log_{81} 9 = x$

Solution: $\log_{81} 9 = x$

Writing in the exponential form.

$$81^x = 9$$

$$(9^2)^x = 9$$

$$9^{2x} = 9$$

$$2x = 1$$

$$x = \frac{1}{2} \text{ Ans}$$

(iii) $\log_{64} 8 = \frac{x}{2}$

Solution: $\log_{64} 8 = \frac{x}{2}$

Writing in exponential form.

$$64^{\frac{x}{2}} = 8$$

$$(8^2)^{\frac{x}{2}} = 8$$

$$8^x = 8$$

$$x = 1 \text{ Ans}$$

(iv) $\log_x 64 = 2$

Solution: $\log_x 64 = 2$

Writing in exponential form

$$x^2 = 64$$

$$x^2 = 8^2$$

$$x = 8 \text{ Ans}$$

(v) $\log_3 x = 4$

Solution: $\log_3 x = 4$

$$3^4 = x$$

$$81 = x$$

$$\text{Or } x = 81 \text{ Ans}$$

Last Updated: September 2020

Report any mistake at freeilm786@gmail.com