Logarithm :-

1) Solve for x: $\log_{10} x = -2$.

Ans:- $\log_{10} x = -2$.

$\Rightarrow 10^{-2} = x$ $\quad [\because \log_a c = b \Rightarrow a^b = c]$

$\Rightarrow x = \frac{1}{10^2}$

$\Rightarrow x = \frac{1}{100}$.

$\Rightarrow x = 0.01$

2) Find the logarithm of

i) 100 to the base 10.

Ans:- Let $\log_{10} 100 = x$.

$\Rightarrow 10^x = 100$

$\Rightarrow 10^x = 10 \times 10$

$\Rightarrow 10^x = 10^2$

$\Rightarrow x = 2$ $\quad [$if $a^m = a^n$, then $m = n]$

$\therefore \log_{10} 100 = 2$.

3) Find x : if
i) $\log_3 x = 0$

Ans:- consider the equation.

$\log_3 x = 0$

$\Rightarrow 3^0 = x$.

$\Rightarrow 1 = x$ or $x = 1$.

4) Find x : if $\log_5 (x-7) = 1$

Ans:- Consider the equation :-

$\log_5 (x-7) = 1$.

$\Rightarrow 5^1 = x-7$

$\Rightarrow 5 = x-7$

$\Rightarrow x = 5+7 = 12$.

5) Evaluate :- i) $\log_{10} 0.01$

Ans:- Let $\log_{10} 0.01 = x$

$\Rightarrow 10^x = 0.01$

$\Rightarrow 10^x = \frac{1}{100}$ $\Rightarrow 10^x = \frac{1}{10 \times 10}$

$\Rightarrow 10^x = \frac{1}{10^2}$

$\Rightarrow 10^x = 10^{-2}$

$\Rightarrow x = -2.$

$\therefore \log_{10} 0.01 = -2$

6) Evaluate :- $\log_2 (1 \div 8)$

Ans :- Let $\log_2 \frac{1}{8} = x$

$\Rightarrow 2^x = \frac{1}{8}$

$\Rightarrow 2^x = \frac{1}{2 \times 2 \times 2}$

$\Rightarrow 2^x = \frac{1}{2^3} \Rightarrow 2^x = 2^{-3}$

$\Rightarrow x = -3$

Then, $\log_2 \frac{1}{8} = -3.$

7) Evaluate :- $\log (x+1) + \log (x-1) = \log 24$

Ans :- $\log (x+1)(x-1) = \log 24.$

$\Rightarrow \log (x^2-1) = \log 24. \Rightarrow x^2 - 1 = 24$

$\Rightarrow x^2 = 24 + 1 = 25$

$\Rightarrow x = 5$ (Ans)

8) Convert into logarithm form :-

i) $5^2 = 25$

Ans :- $5^2 = 25.$

Applying log on both sides,

10) Find the value of x:-

i) $\log_{10} x = -2$.

Ans:- Let us simplify the expression:-

$(10)^{-2} = \log x$.

$\Rightarrow x = \frac{1}{(10)^2} = \frac{1}{100}$

$\Rightarrow x = 0.01$.

11) Find the value of x:- $\log_x \frac{1}{4} = -1$.

Let us simplify the expression:-

$(x)^{-1} = \frac{1}{4} \Rightarrow x^{-1} = 4^{-1}$.

Since the powers are same

So, $x = 4$.

12) Write down 10^{36-1} in terms of y.

$10^{36-1} = (10)^{36} / (10)^1 \Rightarrow (10^6)^3$

$\Rightarrow (10^6)^3 / (10)$.

Substituting the value of $(10^6 = y)$, we get

$\Rightarrow y^3 / 10$

13) Write 10^{2b+1} in terms of y.

$10^{2b+1} = 10^{2b} \times 10^1$

$= (10^4)^{b/2} \times 10^1$

$= (10^{b/2})^4 \times 10^1$

$\Rightarrow 10^1 \times y^4$ (Substituting the value $10^{b/2}$ by y, we get).

$\Rightarrow 10y^4$.

14) Simplify:- $\log a^3 - \log a^2$.

Ans:- $\log a^3 - \log a^2 = \log \left(\frac{a^3}{a^2}\right)$ (By Quotient law)

$= \log a$ (Ans)

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