

9th Math Exercise No. 2.2

Q.1 Express each of the following in logarithmic form :

(i) $10^3 = 1000$

Solution :

$$10^3 = 1000$$

$$\Rightarrow \log 1000 = 3$$

(ii) $2^8 = 256$

Solution :

$$\log_2 256 = 8$$

(iii) $3^{-3} = \frac{1}{27}$

Solution

$$\log_3 \frac{1}{27} = -3$$

(iv) $20^2 = 400$

Solution

$$\log_{20} 400 = 2$$

(v) $16^{-\frac{1}{4}} = \frac{1}{2}$

Solution

$$\log_{16} \frac{1}{2} = -\frac{1}{4}$$

(vi) $11^2 = 121$

Solution

$$\log_{11} 121 = 2$$

(vii) $p = q^r$

Solution :

$$p = q^r$$

$$\Rightarrow \log_q p = r$$

(viii) $(32)^{-\frac{1}{5}} = \frac{1}{2}$

Solution :

$$\log_{32} \frac{1}{2} = -\frac{1}{5}$$

Q.2 Express each of the following in exponential forms

(i) $\log_5 125 = 3$

Solution :

$$\log_5 125 = 3$$

$$\Rightarrow 5^3 = 125$$

(ii) $\log_2 16 = 4$

Solution :

$$\Rightarrow 2^4 = 16$$

(iii) $\log_{23} 1 = 0$

Solution :

$$23^0 = 1$$

(iv) $\log_5 5 = 1$

Solution:

(v) $\log_2 \frac{1}{8} = -3$

$$5^1 = 5$$

$$\text{Solution: } 2^{-3} = \frac{1}{8}$$

$$(vi) \frac{1}{2} = \log_9 3$$

$$\text{Solution: } 9^{\frac{1}{2}} = 3$$

$$(vii) 5 = \log_{10} 100000$$

$$\text{Solution: } 10^5 = 100000$$

$$(vii) \log_4 \frac{1}{16} = -2$$

Solution:

$$\log_4 \frac{1}{16} = -2$$

$$4^{-2} = \frac{1}{16}$$

Q. 3 Find the value of x in each of the following:

$$(i) \log_x 64 = 3$$

Solution:

$$x^3 = 64$$

$$x^3 = 4^3$$

$$x = 4$$

$$(ii) \log_5 1 = x$$

Solution: In exponential form

$$5^x = 1 \Rightarrow 5^x = 5^0 \Rightarrow x = 0$$

$$(iii) \log_x 8 = 1 \quad \text{In exponential form}$$

$$\Rightarrow x^1 = 8$$

$$x = 8$$

$$(iv) \log_{10} x = -3$$

$$\text{Solution } 10^{-3} = x \Rightarrow 1/10^3 = x \Rightarrow x = \frac{1}{1000} = 0.001$$

$$(v) \log_4 x = \frac{3}{2} \quad 4^{\frac{3}{2}} = x$$

$$2^{2 \times \frac{3}{2}} = x \Rightarrow x = 2^3 = 8$$

$$(vi) \log_2 1024 = x$$

$$2^x = 1024 \Rightarrow 2^x = 2^{10} \quad x = 10$$