

1. Choose the correct answer for the following:

(i) $a^m \times a^n$ is equal to

- (A) $a^m + a^n$ (B) a^{m-n} (C) a^{m+n} (D) a^{mn}

(ii) p^0 is equal to

- (A) 0 (B) 1 (C) -1 (D) p

(iii) In 10^2 , the exponent is

- (A) 2 (B) 1 (C) 10 (D) 100

(iv) 6^{-1} is equal to

- (A) 6 (B) -1 (C) $-\frac{1}{6}$ (D) $\frac{1}{6}$

(v) The multiplicative inverse of 2^{-4} is

- (A) 2 (B) 4 (C) 2^4 (D) -4

(vi) $(-2)^{-5} \times (-2)^6$ is equal to

- (A) -2 (B) 2 (C) -5 (D) 6

(vii) $(-2)^{-2}$ is equal to

- (A) $\frac{1}{2}$ (B) $\frac{1}{4}$ (C) $-\frac{1}{2}$ (D) $-\frac{1}{4}$

(viii) $(2^0 + 4^{-1}) \times 2^2$ is equal to

- (A) 2 (B) 5 (C) 4 (D) 3

(ix) $\left(\frac{1}{3}\right)^{-4}$ is equal to

- (A) 3 (B) 3^4 (C) 1 (D) 3^{-4}

(x) $(-1)^{50}$ is equal to

- (A) -1 (B) 50 (C) -50 (D) 1

2. Simplify:

(i) $(-4)^5 \div (-4)^8$ (ii) $\left(\frac{1}{2^3}\right)^2$ (iii) $(-3)^4 \times \left(\frac{5}{3}\right)^4$

(iv) $\left(\frac{2}{3}\right)^5 \times \left(\frac{3}{4}\right)^2 \times \left(\frac{1}{5}\right)^2$ (v) $(3^{-7} \div 3^{10}) \times 3^{-5}$ (vi) $\frac{2^6 \times 3^2 \times 2^3 \times 3^7}{2^8 \times 3^6}$

(vii) $y^{a-b} \times y^{b-c} \times y^{c-a}$ (viii) $(4p)^3 \times (2p)^2 \times p^4$ (ix) $9^{5/2} - 3 \times 5^0 - \left(\frac{1}{81}\right)^{-1/2}$

(x) $\left(\frac{1}{4}\right)^{-2} - 3 \times 8^{2/3} \times 4^0 + \left(\frac{9}{16}\right)^{-1/2}$

3. Find the value of:

(i) $(3^0 + 4^{-1}) \times 2^2$ (ii) $(2^{-1} \times 4^{-1}) \div 2^{-2}$ (iii) $\left(\frac{1}{2}\right)^{-2} + \left(\frac{1}{3}\right)^{-2} + \left(\frac{1}{4}\right)^{-2}$

(iv) $(3^{-1} + 4^{-1} + 5^{-1})^0$ (v) $\left[\left(\frac{-2}{3}\right)^{-2}\right]^2$ (vi) $7^{-20} - 7^{-21}$.

4. Find the value of m for which

(i) $5^m \div 5^{-3} = 5^5$ (ii) $4^m = 64$ (iii) $8^{m-3} = 1$

(iv) $(a^3)^m = a^9$ (v) $(5^m)^2 \times (25)^3 \times 125^2 = 1$ (vi) $2m = (8)^{\frac{1}{3}} \div (2^3)^{2/3}$

5. (a) If $2^x = 16$, find

(i) x (ii) $2^{\frac{x}{2}}$ (iii) 2^{2x} (iv) 2^{x+2} (v) $\sqrt{2^{-x}}$

(b) If $3^x = 81$, find

(i) x (ii) 3^{x+3} (iii) $3^{x/2}$ (iv) 3^{2x} (v) 3^{x-6}

6. Prove that (i) $\frac{3^{x+1}}{3^{x(x+1)}} \times \left(\frac{3^x}{3}\right)^{x+1} = 1$, (ii) $\left(\frac{x^m}{x^n}\right)^{m+n} \cdot \left(\frac{x^n}{x^l}\right)^{n+l} \cdot \left(\frac{x^l}{x^m}\right)^{l+m} = 1$

8. Simplify.

(i) $\frac{25 \times t^{-4}}{5^{-3} \times 10 \times t^{-8}} \quad (t \neq 0)$

(ii) $\frac{3^{-5} \times 10^{-5} \times 125}{5^{-7} \times 6^{-5}}$