Exponents Ex-2a

Q1

Answer :

(i) $4^{-3} = \frac{1}{4^3} = \frac{1}{64}$

(ii) $\left(\frac{1}{2}\right)^{-5} = 2^5 = 32$

(iii) $\left(\frac{4}{3}\right)^{-3} = \left(\frac{3}{4}\right)^3 = \frac{3^3}{4^3} = \frac{27}{64}$

(iv) $(-3)^{-4} = \left(\frac{-1}{3}\right)^4 = \frac{(-1)^4}{3^4} = \frac{1}{81}$

(v) $\left(\frac{-2}{3}\right)^{-5} = \left(\frac{-3}{2}\right)^5 = \frac{(-3)^5}{2^5} = \frac{-243}{32}$

Q2

Answer :

(i) $\left(\frac{5}{3}\right)^2 \times \left(\frac{5}{3}\right)^2 = \left(\frac{5}{3}\right)^4 = \frac{5^4}{3^4} = \frac{625}{81}$

(ii) $\left(\frac{5}{6}\right)^6 \times \left(\frac{5}{6}\right)^{-4} = \left(\frac{5}{6}\right)^{(6+(-4))} = \left(\frac{5}{6}\right)^{(6-4)} = \left(\frac{5}{6}\right)^2 = \frac{5^2}{6^2} = \frac{25}{36}$

(iii) $\left(\frac{2}{3}\right)^{-3} \times \left(\frac{2}{3}\right)^{-2} = \left(\frac{2}{3}\right)^{(-3-2)} = \left(\frac{2}{3}\right)^{-5} = \left(\frac{3}{2}\right)^5 = \frac{3^5}{2^5} = \frac{243}{32}$

(iv) $\left(\frac{9}{8}\right)^{-3} \times \left(\frac{9}{8}\right)^2 = \left(\frac{9}{8}\right)^{(-3+2)} = \left(\frac{9}{8}\right)^{-1} = \frac{8}{9}$

Q3

Answer :

(i)

$$\left(\frac{5}{9}\right)^{-2} \times \left(\frac{3}{5}\right)^{-3} \times \left(\frac{3}{5}\right)^{0} = \left(\frac{5}{9}\right)^{-2} \times \left(\frac{3}{5}\right)^{-3+0}$$
$$= \left(\frac{5}{9}\right)^{-2} \times \left(\frac{3}{5}\right)^{-3} = \left(\frac{9}{5}\right)^{2} \times \left(\frac{5}{3}\right)^{3}$$
$$= \frac{9^2}{5^2} \times \frac{5^3}{3^3}$$
$$= \frac{(3^2)^2}{5^2} \times \frac{5^3}{3^3}$$
$$= \frac{3^4}{5^2} \times \frac{5^3}{3^3} = \left(3^{(4-3)}\right) \times \left(5^{(3-2)}\right) = 3 \times 5 = 15$$

(ii)

$$\left(\frac{-3}{5}\right)^{-4} \times \left(\frac{-2}{5}\right)^{2} = \left(\frac{5}{-3}\right)^{4} \times \left(\frac{-2}{5}\right)^{2}$$
$$= \frac{5^4}{-3^4} \times \frac{-2^2}{5^2} = 5^{(4-2)} \times \frac{-2^2}{-3^4} = 5^2 \times \frac{-2^2}{-3^4}$$
$$= 25 \times \frac{4}{81} = \frac{100}{81}$$

(iii)

$$\left(\frac{-2}{3}\right)^{-3} \times \left(\frac{-2}{3}\right)^{-2} = \left(\frac{3}{-2}\right)^{3} \times \left(\frac{3}{-2}\right)^{2}$$
$$= \frac{3^3}{-2^3} \times \frac{3^2}{-2^2} = \frac{3^{(3+2)}}{-2^{(3+2)}} = \frac{3^5}{-2^5} = \frac{-243}{32}$$

Q4

Answer :

(i) $\left\{\left(\frac{-2}{3}\right)^2\right\}^{-2} = \left(\frac{-2}{3}\right)^{2\times(-2)} = \left(\frac{-2}{3}\right)^{-4} = \left(\frac{3}{-2}\right)^{4} = \frac{3^4}{(-2)^4} = \frac{3^4}{2^4} = \frac{81}{16}$

(ii)
$\left[\left\{\left(\frac{-1}{3}\right)^2\right\}^{-2}\right]^{-1} = \left[\left(\frac{-1}{3}\right)^{2\times(-2)}\right]^{-1} = \left[\left(\frac{-1}{3}\right)^{-4}\right]^{-1} = \left(\frac{-1}{3}\right)^{-4\times-1} = \left(\frac{-1}{3}\right)^{4} = \frac{-1^4}{3^4} = \frac{1^4}{3^4}$
$= \frac{1}{81}$

(iii) $\left\{\left(\frac{3}{2}\right)^{-2}\right\}^{2} = \left(\frac{3}{2}\right)^{-2\times2} = \left(\frac{3}{2}\right)^{-4} = \left(\frac{2}{3}\right)^{4} = \frac{2^4}{3^4} = \frac{16}{81}$

********** END **********