

Number Systems: Exercise 1.6

Q.1 Find (i) $64^{\frac{1}{2}}$ (ii) $32^{\frac{1}{5}}$ (iii) $125^{\frac{1}{3}}$
Sol.

$$(i) = (8 \times 8)^{\frac{1}{2}} = (8^2)^{\frac{1}{2}} = 8^{2 \times \frac{1}{2}} = 8^1 = 8$$

$$(ii) 32^{\frac{1}{5}} = (2 \times 2 \times 2 \times 2 \times 2)^{\frac{1}{5}} = (2^5)^{\frac{1}{5}} = 2^{5 \times \frac{1}{5}} = 2^1 = 2$$

$$(iii) 125^{\frac{1}{3}} = (5 \times 5 \times 5)^{\frac{1}{3}} = (5^3)^{\frac{1}{3}} = 5^1 = 5$$

Q.2 Find: (i) $9^{\frac{3}{2}}$ (ii) $32^{\frac{2}{5}}$ (iii) $16^{\frac{3}{4}}$ (iv) $125^{-\frac{1}{3}}$
Sol.

$$(i) 9^{\frac{3}{2}} = (3 \times 3)^{\frac{3}{2}} = (3^2)^{\frac{3}{2}} = 3^{2 \times \frac{3}{2}} = 3^3 = 3 \times 3 \times 3 = 27$$

$$(ii) 32^{\frac{2}{5}} = (2 \times 2 \times 2 \times 2 \times 2)^{\frac{2}{5}} = (2^5)^{\frac{2}{5}} = 2^{5 \times \frac{2}{5}} = 2^2 = 2 \times 2 = 4$$

$$(iii) 16^{\frac{3}{4}} = (2 \times 2 \times 2 \times 2)^{\frac{3}{4}} = (2^4)^{\frac{3}{4}} = 2^{4 \times \frac{3}{4}} = 2^3 = 2 \times 2 \times 2 = 8$$

$$(iv) 125^{-\frac{1}{3}} = \frac{1}{125^{\frac{1}{3}}} = \frac{1}{(5 \times 5 \times 5)^{\frac{1}{3}}} = \frac{1}{(5^3)^{\frac{1}{3}}} = \frac{1}{5}$$

Q.3 Simplify: (i) $2^{\frac{2}{3}} \cdot 2^{\frac{1}{5}}$ (ii) $\left(\frac{1}{3^3}\right)^7$ (iii) $\frac{11^{\frac{1}{2}}}{11^{\frac{1}{4}}}$ (iv) $7^{\frac{1}{2}} \cdot 8^{\frac{1}{2}}$

Sol.

$$(i) 2^{\frac{2}{3}} \cdot 2^{\frac{1}{5}} = 2^{\frac{2}{3} + \frac{1}{5}} = 2^{\frac{10+3}{15}} = 2^{\frac{13}{15}}$$

$$(ii) \left(\frac{1}{3^3}\right)^7 = \frac{(1)^7}{3^{2 \times 7}} = \frac{1}{3^{14}}$$

$$(iii) \frac{11^{\frac{1}{2}}}{11^{\frac{1}{4}}} = 11^{\frac{1}{2} - \frac{1}{4}} = 11^{\frac{1}{4}}$$

$$(iv) 7^{\frac{1}{2}} \cdot 8^{\frac{1}{2}} = (7 \times 8)^{\frac{1}{2}} = (56)^{\frac{1}{2}}$$