



Exercise 4C

2	216
2	108
2	54
3	27
3	9
3	3
	1

$$\begin{aligned}
 216 &= 2 \times 2 \times 2 \times 3 \times 3 \times 3 \\
 &= (2 \times 2 \times 2) \times (3 \times 3 \times 3) \\
 \sqrt[3]{-216} &= -(2 \times 3) = -6
 \end{aligned}$$

$$\therefore \sqrt[3]{-216} = -(\sqrt[3]{216}) = -6$$

Q10

Answer :

$$\sqrt[3]{-512}$$

By prime factorisation:

2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

$$\begin{aligned}
 \sqrt[3]{512} &= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \\
 &= (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (2 \times 2 \times 2) \\
 \sqrt[3]{-512} &= -\sqrt[3]{(2 \times 2 \times 2)} = -8
 \end{aligned}$$

$$\therefore \sqrt[3]{-512} = -(\sqrt[3]{512}) = -8$$

Q11

Answer :

$$\sqrt[3]{-1331}$$

By prime factorisation:

$$\sqrt[3]{1331} = \sqrt[3]{11 \times 11 \times 11}$$

$$\begin{array}{r|l}
 11 & 1331 \\
 \hline
 11 & 121 \\
 \hline
 11 & 11 \\
 \hline
 & 1
 \end{array}$$

$$\begin{aligned}
 \sqrt[3]{-1331} &= -(11 \times 11 \times 11)^{\frac{1}{3}} = -11 \\
 \therefore \sqrt[3]{-1331} &= -(\sqrt[3]{1331}) = -11
 \end{aligned}$$

Q12

Answer :

$$\sqrt[3]{\frac{27}{64}}$$

By prime factorisation:

$$\begin{array}{r|l}
 3 & 27 \\
 \hline
 3 & 9 \\
 \hline
 3 & 3 \\
 \hline
 & 1
 \end{array}
 \qquad
 \begin{array}{r|l}
 2 & 64 \\
 \hline
 2 & 32 \\
 \hline
 2 & 16 \\
 \hline
 2 & 8 \\
 \hline
 2 & 4 \\
 \hline
 2 & 2 \\
 \hline
 & 1
 \end{array}$$

$$\begin{aligned}
 \sqrt[3]{\frac{27}{64}} &= \frac{\sqrt[3]{27}}{\sqrt[3]{64}} = \frac{\sqrt[3]{(3 \times 3 \times 3)}}{\sqrt[3]{(2 \times 2 \times 2) \times (2 \times 2 \times 2)}} = \frac{\sqrt[3]{(3 \times 3 \times 3)}}{\sqrt[3]{(4 \times 4 \times 4)}} = \frac{3}{4} \\
 \therefore \sqrt[3]{\frac{27}{64}} &= \frac{3}{4}
 \end{aligned}$$

Q13

Answer :

$$\sqrt[3]{\frac{125}{216}}$$

By prime factorisation:

$$\begin{array}{r|l} 5 & 125 \\ \hline 5 & 25 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 2 & 216 \\ \hline 2 & 108 \\ \hline 2 & 54 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$\sqrt[3]{\frac{125}{216}} = \frac{\sqrt[3]{5 \times 5 \times 5}}{\sqrt[3]{(2 \times 2 \times 2) \times (3 \times 3 \times 3)}} = \frac{\sqrt[3]{5 \times 5 \times 5}}{\sqrt[3]{(6 \times 6 \times 6)}} = \frac{5}{6}$$

$$\therefore \sqrt[3]{\frac{125}{216}} = \frac{5}{6}$$

Q14

Answer :

$$\sqrt[3]{\frac{-27}{125}}$$

$$\begin{array}{r|l} 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$\begin{array}{r|l} 5 & 125 \\ \hline 5 & 25 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

By factorisation:

$$\sqrt[3]{\frac{-27}{125}} = \sqrt[3]{\frac{3 \times 3 \times 3}{5 \times 5 \times 5}}$$

$$\therefore \sqrt[3]{\frac{-27}{125}} = \frac{-3}{5}$$

Q15

Answer :

$$\sqrt[3]{\frac{-64}{343}}$$

On factorisation:

$$\begin{array}{r|l} 2 & 64 \\ \hline 2 & 32 \end{array}$$

$$\begin{array}{r|l}
 2 & 16 \\
 \hline
 2 & 8 \\
 \hline
 2 & 4 \\
 \hline
 2 & 2 \\
 \hline
 & 1
 \end{array}$$

$$\begin{array}{r|l}
 7 & 49 \\
 \hline
 7 & 7 \\
 \hline
 & 1
 \end{array}$$

$$\begin{aligned}
 & \sqrt[3]{\frac{64}{343}} = \sqrt[3]{\frac{2 \times 2 \times 2 \times 2 \times 2 \times 2}{7 \times 7 \times 7}} \\
 \therefore & \sqrt[3]{\frac{-64}{343}} = \frac{-4}{7}
 \end{aligned}$$

Q16

Answer :

$$\begin{aligned}
 & \sqrt[3]{64 \times 729} \\
 \sqrt[3]{64 \times 729} &= \sqrt[3]{64} \times \sqrt[3]{729} \\
 &= \sqrt[3]{4 \times 4 \times 4} \times \sqrt[3]{(3 \times 3 \times 3) \times (3 \times 3 \times 3)} \\
 &= \sqrt[3]{4 \times 4 \times 4} \times \sqrt[3]{(9 \times 9 \times 9)} \\
 \sqrt[3]{64 \times 729} &= (4) \times (9) = 36
 \end{aligned}$$

Q17

Answer :

$$\begin{aligned}
 & \sqrt[3]{\frac{729}{1000}} \\
 \begin{array}{r|l}
 3 & 729 \\
 \hline
 3 & 243 \\
 \hline
 3 & 81 \\
 \hline
 3 & 27 \\
 \hline
 3 & 9 \\
 \hline
 3 & 3 \\
 \hline
 & 1
 \end{array}
 &
 \begin{array}{r|l}
 2 & 1000 \\
 \hline
 2 & 500 \\
 \hline
 2 & 250 \\
 \hline
 5 & 125 \\
 \hline
 5 & 25 \\
 \hline
 5 & 5 \\
 \hline
 & 1
 \end{array}
 \end{aligned}$$

On factorisation:

$$\begin{aligned}
 \sqrt[3]{\frac{729}{1000}} &= \frac{\sqrt[3]{(3 \times 3 \times 3) \times (3 \times 3 \times 3)}}{\sqrt[3]{(2 \times 2 \times 2) \times (5 \times 5 \times 5)}} = \frac{\sqrt[3]{9 \times 9 \times 9}}{\sqrt[3]{10 \times 10 \times 10}} \\
 \sqrt[3]{\frac{729}{1000}} &= \frac{9}{10}
 \end{aligned}$$

Q18

Answer :

$$\sqrt[3]{\frac{-512}{343}}$$

By factorisation:

$$\begin{array}{r|l}
 2 & 512 \\
 \hline
 2 & 256 \\
 \hline
 2 & 128
 \end{array}$$

$$\begin{array}{r|l}
 2 & 64 \\
 2 & 32 \\
 2 & 16 \\
 2 & 8 \\
 2 & 4 \\
 2 & 2 \\
 & 1
 \end{array}$$

$$\begin{array}{r|l}
 7 & 343 \\
 7 & 49 \\
 7 & 7 \\
 & 1
 \end{array}$$

$$\begin{array}{l}
 \sqrt[3]{\frac{512}{343}} \quad \frac{\sqrt[3]{8 \times 8 \times 8}}{\sqrt[3]{7 \times 7 \times 7}} \\
 \sqrt[3]{\frac{-512}{343}} \quad \frac{-8}{7}
 \end{array}$$

***** END *****