



Exercise 5C

Q1

Answer :

(d) 24

$$\begin{aligned}\left(6^{-1} - 8^{-1}\right)^{-1} &= \left(\frac{1}{6} - \frac{1}{8}\right)^{-1} \\ &= \left(\frac{4-3}{24}\right)^{-1} \quad [\text{since L.C.M. of 6 and 8 is 24}] \\ &= \left(\frac{1}{24}\right)^{-1} \\ &= \left(\frac{24}{1}\right)^1 = 24 \quad \left[\text{since } \left(\frac{a}{b}\right)^{-1} = \left(\frac{b}{a}\right)^1\right]\end{aligned}$$

Q2

Answer :

(c) 15

We have:

$$\begin{aligned}\left(5^{-1} \times 3^{-1}\right)^{-1} &= \left(\frac{1}{5} \times \frac{1}{3}\right)^{-1} \\ &= \left(\frac{1}{15}\right)^{-1} \\ &= \left(\frac{15}{1}\right)^1 = 15 \quad \left[\text{since } \left(\frac{a}{b}\right)^{-1} = \left(\frac{b}{a}\right)^1\right]\end{aligned}$$

Q3

Answer :

(c) $\frac{1}{16}$

We have:

$$\begin{aligned}\left(2^{-1} - 4^{-1}\right)^2 &= \left(\frac{1}{2} - \frac{1}{4}\right)^2 \\ &= \left(\frac{2-1}{4}\right)^2 \quad [\text{since L.C.M. of 2 and 4 is 4}] \\ &= \left(\frac{1}{4}\right)^2 \\ &= \left(\frac{1}{4} \times \frac{1}{4}\right) = \frac{1}{16}\end{aligned}$$

Q4

Answer :

(b) 29

We have:

$$\begin{aligned}\left(\frac{1}{2}\right)^{-2} + \left(\frac{1}{3}\right)^{-2} + \left(\frac{1}{4}\right)^{-2} &= \left(\frac{2}{1}\right)^2 + \left(\frac{3}{1}\right)^2 + \left(\frac{4}{1}\right)^2 \quad \left[\text{since } \left(\frac{a}{b}\right)^{-1} = \left(\frac{b}{a}\right)^1\right] \\ &= (2^2 + 3^2 + 4^2) \\ &= (4 + 9 + 16) \\ &= 29\end{aligned}$$

Q5

Answer :

(c) $\frac{6}{5}$

We have:

$$\begin{aligned}\left\{6^{-1} + \left(\frac{3}{2}\right)^{-1}\right\}^{-1} &= \left(\frac{1}{6} + \frac{2}{3}\right)^{-1} \\ &= \left(\frac{1+4}{6}\right)^{-1} \quad [\text{since L.C.M. of 3 and 6 is 6}] \\ &= \left(\frac{5}{6}\right)^{-1} \\ &= \left(\frac{6}{5}\right)^1 = \left(\frac{6}{5}\right) \quad \left[\text{since } \left(\frac{a}{b}\right)^{-1} = \left(\frac{b}{a}\right)^1\right]\end{aligned}$$

Q6

Answer :

(b) 64

We have:

$$\begin{aligned}\left(\frac{-1}{2}\right)^{-6} &= \left(\frac{2}{-1}\right)^6 \quad \left[\text{since } \left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n\right] \\ &= (-2)^6 \\ &= (-2) \times (-2) \times (-2) \times (-2) \times (-2) \times (-2) \\ &= 64\end{aligned}$$

Q7

Answer :

(b) $\frac{-3}{8}$

$$\begin{aligned}
\left\{ \left(\frac{3}{4} \right)^{-1} - \left(\frac{1}{4} \right)^{-1} \right\}^{-1} &= \left(\frac{4}{3} - \frac{4}{1} \right)^{-1} \\
&= \left(\frac{4-12}{3} \right)^{-1} \quad [\text{since L.C.M. of 1 and 3 is 3}] \\
&= \left(\frac{-8}{3} \right)^{-1} \\
&= \left(\frac{3}{-8} \right)^1 \quad \left[\text{since } \left(\frac{a}{b} \right)^{-1} = \left(\frac{b}{a} \right)^1 \right] \\
&= \left(\frac{3 \times -1}{-8 \times -1} \right) = \frac{-3}{8}
\end{aligned}$$

Q8

Answer :

(a) $\frac{1}{16}$

$$\begin{aligned}
\left[\left\{ \left(-\frac{1}{2} \right)^2 \right\}^{-2} \right]^{-1} &= \left[\left(-\frac{1}{2} \right)^{2 \times -2} \right]^{-1} & \left[\text{since } \left\{ \left(\frac{a}{b} \right)^m \right\}^n = \left(\frac{a}{b} \right)^{mn} \right] \\
&= \left[\left(-\frac{1}{2} \right)^{-4} \right]^{-1} \\
&= \left(-\frac{1}{2} \right)^{(-4) \times (-1)} \\
&= \left(-\frac{1}{2} \right)^4 = \frac{(-1)^4}{(2)^4} \\
&= \frac{1}{16}
\end{aligned}$$

Q9

Answer :

(c) 1

$$\begin{aligned}
(a)^0 &= 1 \\
\therefore \left(\frac{5}{6} \right)^0 &= 1
\end{aligned}$$

Q10

Answer :

(b) $\frac{243}{32}$

$$\begin{aligned}
\left(\frac{2}{3} \right)^{-5} &= \left(\frac{3}{2} \right)^5 & \left[\text{since } \left(\frac{a}{b} \right)^{-n} = \left(\frac{b}{a} \right)^n \right] \\
&= \frac{3^5}{2^5} = \frac{3 \times 3 \times 3 \times 3 \times 3}{2 \times 2 \times 2 \times 2 \times 2} = \frac{243}{32}
\end{aligned}$$

Q11

Answer :

(b) $\left(\frac{1}{3} \right)^8$

$$\left\{ \left(\frac{1}{3} \right)^2 \right\}^4 = \left(\frac{1}{3} \right)^{2 \times 4} = \left(\frac{1}{3} \right)^8 \quad \left[\text{since } \left\{ \left(\frac{a}{b} \right)^m \right\}^n = \left(\frac{a}{b} \right)^{mn} \right]$$

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