Exercise 5C

Q1

Answer :

(d) 24

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

Q2

Answer :

(c) 15

We have:

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

Q3

Answer :

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

We have:

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

Q4

Answer :

(b) 29

We have:

$$\left(\frac{1}{2}\right)^{-2}+\left(\frac{1}{3}\right)^{-2}+\left(\frac{1}{4}\right)^{-2}=\left(\frac{2}{1}\right)^2+\left(\frac{3}{1}\right)^2+\left(\frac{4}{1}\right)^2 \qquad \left[since\left(\frac{a}{b}\right)^{-1}=\left(\frac{b}{a}\right)^1\right]$$
$$= (2^2 + 3^2 + 4^2)$$
$$= (4 + 9 + 16)$$
$$= 29$$

Q5

Answer :

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

We have:

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

Q6

Answer :

(b) 64

We have:

$$\left(\frac{-1}{2}\right)^{-6}=\left(\frac{2}{-1}\right)^6 \qquad \left[since\ \left(\frac{a}{b}\right)^{-n}=\left(\frac{b}{a}\right)^n\right]$$
$$=(-2)^6$$
$$=(-2)\times(-2)\times(-2)\times(-2)\times(-2)\times(-2)$$
$$=64$$

Q7

Answer :

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

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

$$=\left(\frac{4-12}{3}\right)^{-1} \quad \text{[since L.C.M. of 1 and 3 is 3]}$$

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

$$=\left(\frac{3}{-8}\right)^{1} \qquad \left[since\ \left(\frac{a}{b}\right)^{-1}=\left(\frac{b}{a}\right)^{1}\right]$$

$$=\left(\frac{3\times-1}{-8\times-1}\right)=\frac{-3}{8}$$

Q8

Answer :

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

$$\left[\left\{\left(-\frac{1}{2}\right)^{2}\right\}^{-2}\right]^{-1}=\left[\left(-\frac{1}{2}\right)^{2\times-2}\right]^{-1} \qquad \left[since\left\{\left(\frac{a}{b}\right)^{m}\right\}^{n}=\left(\frac{a}{b}\right)^{mn}\right]$$

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

$$=\left(-\frac{1}{2}\right)^{(-4)\times(-1)}$$

$$=\left(-\frac{1}{2}\right)^{4}=\frac{(-1)^{4}}{(2)^{4}}$$

$$=\frac{1}{16}$$

Q9

Answer :

(c) 1

$(a)^0 = 1$

$\therefore \left(\frac{5}{6}\right)^{0}=1$

Q10

Answer :

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

$$\left(\frac{2}{3}\right)^{-5}=\left(\frac{3}{2}\right)^{5} \qquad \left[since\ \left(\frac{a}{b}\right)^{-n}=\left(\frac{b}{a}\right)^{n}\right]$$

$$=\frac{3^5}{2^5}=\frac{3\times3\times3\times3\times3}{2\times2\times2\times2\times2}=\frac{243}{32}$$

Q11

Answer :

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

$$\left\{\left(\frac{1}{3}\right)^{2}\right\}^{4}=\left(\frac{1}{3}\right)^{2\times4}=\left(\frac{1}{3}\right)^{8} \qquad \left[since\left\{\left(\frac{a}{b}\right)^{m}\right\}^{n}=\left(\frac{a}{b}\right)^{mn}\right]$$

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