Exponents Ex 6.1 Q11

Answer :

We have

(i) Prime factorisation of $36 = 2 \times 2 \times 3 \times 3 = 2^2 \times 3^2$

(ii) Prime factorisation of $675 = 3 \times 3 \times 3 \times 5 \times 5 = 3^3 \times 5^2$

(iii) Prime factorisation of $392 = 2 \times 2 \times 2 \times 7 \times 7 = 2^3 \times 7^2$

Exponents Ex 6.1 Q12
Answer :

We have
(i) Prime factorisation of $450 = 2 \times 3 \times 3 \times 5 \times 5 = 2 \times 3^2 \times 5^2$

(ii) Prime factorisation of $2800 = 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 7 = 2^4 \times 5^2 \times 7$

(iii) Prime factorisation of $24000 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 5 \times 5 = 2^6 \times 3 \times 5^3$

Exponents Ex 6.1 Q13

Answer :

We have

(i) $\left(\dfrac{3}{7}\right)^2 = \dfrac{3}{7} \times \dfrac{3}{7} = \dfrac{9}{49}$

(ii) $\left(\dfrac{7}{9}\right)^3 = \dfrac{7}{9} \times \dfrac{7}{9} \times \dfrac{7}{9} = \dfrac{343}{729}$

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

Exponents Ex 6.1 Q14

Answer :

We have

(i) $\frac{49}{64} = \frac{7}{8} \times \frac{7}{8} = \frac{(7)^2}{(8)^2} = \left(\frac{7}{8}\right)^2$

(ii) $-\frac{64}{125} = -\frac{4}{5} \times -\frac{4}{5} \times -\frac{4}{5} = -\frac{(4)^3}{(5)^3} = \left(-\frac{4}{5}\right)^3$

(iii) $-\frac{1}{216} = \frac{-1}{6} \times \frac{-1}{6} \times \frac{-1}{6} = \frac{(-1)^3}{(6)^3} = \left(\frac{-1}{6}\right)^3$

Exponents Ex 6.1 Q15

Answer :

We have

(i)

$\left(\frac{-1}{2}\right)^2 \times 2^3 \times \left(\frac{3}{4}\right)^2 = \frac{1}{4} \times 8 \times \frac{9}{16} = \frac{1}{4} \times \frac{9}{2} = \frac{9}{8}$

$\left[\text{Since } \left(\frac{-1}{2}\right)^2 = \frac{1}{4}, \; 2^3 = 8 \text{ and } \left(\frac{3}{4}\right)^2 = \frac{9}{16}\right]$

(ii)

$\left(\frac{-3}{5}\right)^4 \times \left(\frac{4}{9}\right)^4 \times \left(\frac{-15}{18}\right)^2$

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

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

$= \frac{81}{5^4} \times \frac{4^4}{81 \times 9^2} \times \frac{(-3)^2 \times 5^2}{2^2 \times 9^2}$

$= \frac{1}{5^4} \times \frac{4^4}{9^2} \times \frac{(-3)^2 \times 5^2}{2^2 \times 9^2}$

$= \frac{1}{5^4} \times \frac{4^4}{9^2} \times \frac{9 \times 5^2}{4 \times 9^2}$

$= \frac{1}{5^2} \times \frac{4^3}{9^2} \times \frac{1}{9}$

$= \frac{1 \times 4^3}{5^2 \times 9^3} = \frac{64}{25 \times 729} = \frac{64}{18225}$ $\left[\text{Since } 4^3 = 64, \; 5^2 = 25 \text{ and } 9^3 = 729\right]$

Exponents Ex 6.1 Q16

Answer :

We have $a = 2$ and $b = 3$.

Thus,

(i) $(a + b)^a = (2 + 3)^2 = (5)^2 = 25$

(ii) $(ab)^b = (2 \times 3)^3 = (6)^3 = 216$

(iii) $\left(\frac{b}{a}\right)^b = \left(\frac{3}{2}\right)^3 = \frac{3}{2} \times \frac{3}{2} \times \frac{3}{2} = \frac{27}{8}$

(iv) $\left(\frac{a}{b} + \frac{b}{a}\right)^a = \left(\frac{2}{3} + \frac{3}{2}\right)^2 = \left(\frac{4+9}{6}\right)^2 = \left(\frac{13}{6}\right)^2 = \frac{169}{36}$

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