

RD SHARMA

Solutions

Class 7 Maths

Chapter 6

Ex 6.1

Q1. Find the values of each of the following :

(i) 13^2

(ii) 7^3

(iii) 3^4

Sol:

$$\begin{aligned} \text{(i) } 13^2 &= 13 \times 13 \\ &= 169 \end{aligned}$$

$$\begin{aligned} \text{(ii) } 7^3 &= 7 \times 7 \times 7 \\ &= 49 \end{aligned}$$

$$\begin{aligned} \text{(iii) } 3^4 &= 3 \times 3 \times 3 \times 3 \\ &= 81 \end{aligned}$$

Q2. Find the value of each of the following :

(i) $(-7)^2$

(ii) $(-3)^4$

(iii) $(-5)^5$

Sol:

We know that if 'a' is a natural number, then

$$(-a)^{\text{even number}} = \text{positive number}$$

$$(-a)^{\text{odd number}} = \text{negative number}$$

We have,

$$\begin{aligned} \text{(i) } (-7)^2 &= (-7) \times (-7) \\ &= 49 \end{aligned}$$

$$\begin{aligned} \text{(ii) } (-3)^4 &= (-3) \times (-3) \times (-3) \times (-3) \\ &= 81 \end{aligned}$$

$$\begin{aligned} \text{(iii) } (-5)^5 &= (-5) \times (-5) \times (-5) \times (-5) \times (-5) \\ &= -3125 \end{aligned}$$

Q3. Simply :

(i) 3×10^2

(ii) $2^2 \times 5^3$

(iii) $3^3 \times 5^2$

Sol:

$$\begin{aligned} \text{(i) } 3 \times 10^2 &= 3 \times 10 \times 10 \\ &= 3 \times 100 \\ &= 300 \end{aligned}$$

$$\begin{aligned} \text{(ii) } 2^2 \times 5^3 &= 2 \times 2 \times 5 \times 5 \times 5 \\ &= 4 \times 125 \\ &= 500 \end{aligned}$$

$$\begin{aligned} \text{(iii) } 3^3 \times 5^2 &= 3 \times 3 \times 3 \times 5 \times 5 \\ &= 27 \times 25 \\ &= 675 \end{aligned}$$

Q4. Simply :

$$(i) 3^2 \times 10^4$$

$$(ii) 2^4 \times 3^2$$

$$(iii) 5^2 \times 3^4$$

Sol:

$$(i) 3^2 \times 10^4 = 3 \times 3 \times 10 \times 10 \times 10 \times 10$$

$$= 9 \times 10000$$

$$= 90000$$

$$(ii) 2^4 \times 3^2 = 2 \times 2 \times 2 \times 2 \times 3 \times 3$$

$$= 16 \times 9$$

$$= 144$$

$$(iii) 5^2 \times 3^4 = 5 \times 5 \times 3 \times 3 \times 3 \times 3$$

$$= 25 \times 81$$

$$= 2025$$

Q5. Simply :

$$(i) (-2) \times (-3)^3$$

$$(ii) (-3)^2 \times (-5)^3$$

$$(iii) (-2)^5 \times (-10)^2$$

Sol:

$$(i) (-2) \times (-3)^3 = (-2) \times (-3) \times (-3) \times (-3)$$

$$= (-2) \times (-27)$$

$$= 54$$

$$(ii) (-3)^2 \times (-5)^3 = (-3) \times (-3) \times (-5) \times (-5) \times (-5)$$

$$= 9 \times (-125)$$

$$= -1125$$

$$(iii) (-2)^5 \times (-10)^2 = (-2) \times (-2) \times (-2) \times (-2) \times (-2) \times (-10) \times (-10)$$

$$= (-32) \times 100$$

$$= -3200$$

Q6. Simply :

$$(i) \left(\frac{3}{4}\right)^2$$

$$(ii) \left(\frac{-2}{3}\right)^4$$

$$(iii) \left(\frac{-4}{5}\right)^5$$

Sol:

$$(i) \left(\frac{3}{4}\right)^2 = \frac{3 \times 3}{4 \times 4}$$

$$= \frac{9}{16}$$

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

$$= \frac{16}{81}$$

$$(iii) \left(\frac{-4}{5}\right)^5 = \frac{(-4) \times (-4) \times (-4) \times (-4) \times (-4)}{5 \times 5 \times 5 \times 5 \times 5}$$

$$= \frac{-1024}{3125}$$

Q7. Identify the greater number in each of the following

(i) 2^5 or 5^2

(ii) 3^4 or 4^3

(iii) 3^5 or 5^3

Sol:

(i) 2^5 or 5^2

$$\Rightarrow 2^5 = 2 \times 2 \times 2 \times 2 \times 2$$

$$= 32$$

$$\Rightarrow 5^2 = 5 \times 5$$

$$= 25$$

Therefore, $2^5 > 5^2$

(ii) 3^4 or 4^3

$$\Rightarrow 3^4 = 3 \times 3 \times 3 \times 3$$

$$= 81$$

$$\Rightarrow 4^3 = 4 \times 4 \times 4$$

$$= 64$$

Therefore, $3^4 > 4^3$

(iii) 3^5 or 5^3

$$\Rightarrow 3^5 = 3 \times 3 \times 3 \times 3 \times 3$$

$$= 243$$

$$\Rightarrow 5^3 = 5 \times 5 \times 5$$

$$= 125$$

Therefore, $3^5 > 5^3$

Q8. Express each of the following in exponential form

(i) $(-5) \times (-5) \times (-5)$

(ii) $(\frac{-5}{7} \times \frac{-5}{7} \times \frac{-5}{7} \times \frac{-5}{7})$

(iii) $(\frac{4}{3} \times \frac{4}{3} \times \frac{4}{3} \times \frac{4}{3} \times \frac{4}{3})$

Sol:

(i) $(-5) \times (-5) \times (-5) = (-5)^3$

(ii) $(\frac{-5}{7} \times \frac{-5}{7} \times \frac{-5}{7} \times \frac{-5}{7}) = (\frac{-5}{7})^4$

(iii) $(\frac{4}{3} \times \frac{4}{3} \times \frac{4}{3} \times \frac{4}{3} \times \frac{4}{3}) = (\frac{4}{3})^5$

Q9. Express each of the following in exponential form

(i) $x \times x \times x \times x \times a \times a \times a \times b \times b \times b$

(ii) $(-2) \times (-2) \times (-2) \times (-2) \times a \times a \times a$

(iii) $(\frac{-2}{3}) \times (\frac{-2}{3}) \times x \times x \times x$

Sol:

(i) $x \times x \times x \times x \times a \times a \times a \times b \times b \times b = x^4 a^3 b^3$

(ii) $(-2) \times (-2) \times (-2) \times (-2) \times a \times a \times a = (-2)^4 a^3$

(iii) $(\frac{-2}{3}) \times (\frac{-2}{3}) \times x \times x \times x = (\frac{-2}{3})^2 x^3$

Q10. Express each of the following numbers in exponential form

(i) 512

(ii) 625

(iii) 729

Sol:

$$(i) 512 = 2^9$$

$$(iii) 625 = 5^4$$

$$(iii) 729 = 3^6$$

Q11. Express each of the following numbers as a product of powers of their prime factors

(i) 36

(ii) 675

(iii) 392

Sol:

$$(i) 36 = 2 \times 2 \times 3 \times 3$$

$$= 2^2 \times 3^2$$

$$(ii) 675 = 3 \times 3 \times 3 \times 5 \times 5$$

$$= 3^3 \times 5^2$$

$$(iii) 392 = 2 \times 2 \times 2 \times 7 \times 7$$

$$= 2^3 \times 7^2$$

Q12. Express each of the following numbers as a product of powers of their prime factors

(i) 450

(ii) 2800

(iii) 24000

Sol:

$$(i) 450 = 2 \times 3 \times 3 \times 5 \times 5$$

$$= 2 \times 3^2 \times 5^2$$

$$(ii) 2800 = 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 7$$

$$= 2^4 \times 5^2 \times 7$$

$$(iii) 24000 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 5 \times 5$$

$$= 2^5 \times 3 \times 5^3$$

Q13. Express each of the following as a rational number of the form $\frac{p}{q}$

$$(i) \left(\frac{3}{7}\right)^2$$

$$(ii) \left(\frac{7}{9}\right)^3$$

$$(iii) \left(\frac{-2}{3}\right)^4$$

Sol:

$$(i) \left(\frac{3}{7}\right)^2 = \frac{3 \times 3}{7 \times 7}$$

$$= \frac{9}{49}$$

$$(ii) \left(\frac{7}{9}\right)^3 = \frac{7 \times 7 \times 7}{9 \times 9 \times 9}$$

$$= \frac{343}{729}$$

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

$$= \frac{16}{81}$$

Q14. Express each of the following rational numbers in power notation

(i) $\frac{49}{64}$

(ii) $-\frac{64}{125}$

(iii) $-\frac{1}{216}$

Sol:

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

Because $7^2 = 49$ and $8^2 = 64$

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

Because $4^3 = 64$ and $5^3 = 125$

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

Because $1^3 = 1$ and $6^3 = 216$

Q15. Find the value of the following

(i) $\left(-\frac{1}{2}\right)^2 \times 2^3 \times \left(\frac{3}{4}\right)^2$

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

Sol:

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

$= \frac{9}{2}$

(ii) $\left(\frac{-3}{5}\right)^4 \times \left(\frac{4}{9}\right)^4 \times \left(\frac{-15}{18}\right)^2 = \frac{81}{625} \times \frac{256}{6561} \times \frac{225}{324} = \frac{64}{18225}$

Q16. If a= 2 and b = 3, the find the values of each of the following

(i) $(a + b)^a$

(ii) $(ab)^b$

(iii) $\left(\frac{b}{a}\right)^b$

(iv) $\left(\frac{a}{b} + \frac{b}{a}\right)^a$

Sol:

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

$= (5)^2$

$= 25$

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

$= (6)^3$

$= 216$

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

$= \frac{27}{8}$

(iv) $\left(\frac{a}{b} + \frac{b}{a}\right)^a = \left(\frac{2}{3} + \frac{3}{2}\right)^2$

$= \frac{169}{36}$