

Sangeevani Public School

Assignment No-2

Subject - Maths

Class - VIII

CH- 2 Exponents and powers

B-1

Let us do 2.1
Evaluate and Express each of the following
as a rational number:

$$(i) \left(\frac{2}{3}\right)^4 \quad (ii) \left(\frac{-3}{4}\right)^3 \quad (iii) \left(\frac{-4}{9}\right)^4 \quad (iv) \left(\frac{1}{3}\right)^5$$

Sol (i) $\left(\frac{2}{3}\right)^4 = \frac{2}{3} \times \frac{2}{3} \times \frac{2}{3} \times \frac{2}{3} = \frac{16}{81}$

(ii) $\left(\frac{-3}{4}\right)^3 = \frac{-3}{4} \times \frac{-3}{4} \times \frac{-3}{4} = \frac{-27}{64}$

(iii) $\left(\frac{-4}{9}\right)^4 = \frac{-4}{9} \times \frac{-4}{9} \times \frac{-4}{9} \times \frac{-4}{9} = \frac{256}{6561}$

(iv) $\left(\frac{1}{3}\right)^5 = \frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} = \frac{1}{243}$

2 Simplify and Express in the exponential form.

(i) $\left(\frac{3}{2}\right)^5 \times \left(\frac{3}{2}\right)^7$

Sol $\left(\frac{3}{2}\right)^5 \times \left(\frac{3}{2}\right)^7 = \left(\frac{3}{2}\right)^{5+7} = \left(\frac{3}{2}\right)^{12}$

$$\left[\left(\frac{p}{q}\right)^m \times \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m+n} \right]$$

III $\left(\frac{3}{11}\right)^2 \times \left(\frac{3}{11}\right)^5 \times \left(\frac{3}{11}\right)^9$

Sol $\left(\frac{3}{11}\right)^2 \times \left(\frac{3}{11}\right)^5 \times \left(\frac{3}{11}\right)^9 = \left(\frac{3}{11}\right)^{2+5} \times \left(\frac{3}{11}\right)^9$
 $= \left(\frac{3}{11}\right)^7 \times \left(\frac{3}{11}\right)^9 = \left(\frac{3}{11}\right)^{7+9} = \left(\frac{3}{11}\right)^{16}$

$$\therefore \left(\frac{p}{q}\right)^m \times \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m+n}$$

IV $\left(\frac{11}{7}\right)^9 \div \left(\frac{11}{7}\right)^7$

Sol $\left(\frac{11}{7}\right)^{9-7} = \left(\frac{11}{7}\right)^2$ $\left[\because \left(\frac{p}{q}\right)^m \div \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m-n} \right]$

V $\left(\frac{4}{9}\right)^5 \div \left(\frac{4}{9}\right)^7$

Sol $\left(\frac{4}{9}\right)^{5-7} = \left(\frac{4}{9}\right)^{-2}$ $\left[\because \left(\frac{p}{q}\right)^m \div \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m-n} \right]$

$$\left[\frac{4}{9}\right]^{-2} = \left[\frac{9}{4}\right]^2 \left[\because \left(\frac{p}{q}\right)^m \div \left(\frac{p}{q}\right)^n = \frac{1}{\left(\frac{p}{q}\right)^{n-m}} \right]$$

If $m < n$

VII $\left[\left(\frac{3}{5}\right)^3\right]^5$

Sol $\left[\left(\frac{3}{5}\right)^3\right]^5 = \left(\frac{3}{5}\right)^{3 \times 5} = \left(\frac{3}{5}\right)^{15}$ $\left[\left(\frac{p}{q}\right)^m \right]^n = \left(\frac{p}{q}\right)^{m \times n} \right]$

xi $\left(\frac{2}{5}\right)^4 \times \left(\frac{15}{16}\right)^4$

sol $\left(\frac{2}{5} \times \frac{15}{16}\right)^4 = \left(\frac{3}{8}\right)^4$

$$\left[\left(\frac{p}{q}\right)^m \times \left(\frac{r}{s}\right)^m = \left(\frac{p \times r}{q \times s}\right)^m\right]$$

3

Evaluate and express as a rational number

(ii) $\left(\frac{2}{9}\right)^7 \div \left(\frac{2}{9}\right)^4$

sol $\left(\frac{2}{9}\right)^7 \div \left(\frac{2}{9}\right)^4 = \left(\frac{2}{9}\right)^{7-4} = \left(\frac{2}{9}\right)^3$

$= \frac{2^3}{9^3} = \frac{8}{729}$

$$\left[\left(\frac{p}{q}\right)^m \div \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m-n}\right]$$

v $\left(\frac{2}{3}\right)^5 \times \left(\frac{2}{3}\right)$

sol $\left(\frac{2}{3}\right)^5 \times \left(\frac{2}{3}\right) = \left(\frac{2}{3}\right)^{5+1} = \left(\frac{2}{3}\right)^6 = \frac{64}{729}$

$$\left[\left(\frac{p}{q}\right)^m \times \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m+n}\right]$$

vi $\left(-\frac{1}{2}\right) \times \left(-\frac{1}{2}\right)^2 \times \left(-\frac{1}{2}\right)^5$

sol $\left(-\frac{1}{2}\right) \times \left(-\frac{1}{2}\right)^2 \times \left(-\frac{1}{2}\right)^5 = \left(-\frac{1}{2}\right)^8 = \frac{1}{256}$

$$\left[\left(\frac{p}{q}\right)^m \times \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m+n}\right]$$

Evaluate

(i) $\left(\frac{5}{4}\right)^{2+3} \div \left(\frac{5}{4}\right)^5$

(ii) $\left(\frac{5}{7}\right)^{2+3} \div \left(\frac{5}{7}\right)^5 = \left(\frac{5}{7}\right)^{5-5} = \left(\frac{5}{7}\right)^0 = 1$

$$\left[\left(\frac{p}{q}\right)^m \div \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m-n}, \left(\frac{p}{q}\right)^0 = 1 \right]$$

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

iv $\left(\frac{4}{9}\right)^3 \times \left(\frac{4}{9}\right)^2 \div \left(\frac{4}{9}\right)^5 = \left(\frac{4}{9}\right)^{3+2} \div \left(\frac{4}{9}\right)^5$
 $= \left(\frac{4}{9}\right)^{5-5} = \left(\frac{4}{9}\right)^0 = 1$

$$\left[\left(\frac{p}{q}\right)^m \times \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m+n}, \left(\frac{p}{q}\right)^m \div \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m-n} \right]$$

5) Simplify each of the following and express the result as power of 5

(i) $\left(\frac{2}{3}\right)^6 \times \left(\frac{2}{3}\right)^3 \div \left(\frac{2}{3}\right)^9$

Sol $\left(\frac{2}{3}\right)^6 \times \left(\frac{2}{3}\right)^3 \div \left(\frac{2}{3}\right)^9 = \left(\frac{2}{3}\right)^{6+3} \div \left(\frac{2}{3}\right)^9$
 $= \left(\frac{2}{3}\right)^{9-9} = \left(\frac{2}{3}\right)^0 = 1 = 5^0$

$$\left[\left(\frac{p}{q}\right)^m \times \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m+n} \right]$$

$$\left[\left(\frac{p}{q}\right)^m \div \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m-n} \right]$$

III

$$(2^0 + 3^0) \div (4^0 + 5^0)$$

Sol

$$= (1+1) \div (1+1)$$

$$= 2 \div 2 = 1 = 5^0$$

$$\left[\left(\frac{p}{q}\right)^0 = 1 \right]$$

⑥ Simplify

(i) $\left(-\frac{2}{3}\right)^4 \times \left(\frac{27}{32}\right)$

Sol

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

$$= (2)^4 \div 3^4 \times (2)^5 \quad 3-4$$

$$= (2)^4 \div 3^4 \times (2)^5 \quad 3-4$$

$$= (2)^{-1} \times (3)^{-1} = \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$$

$$\left[\left(\frac{p}{q}\right)^m \div \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m-n} \right]$$

$$\left[\left(\frac{p}{q}\right)^m \div \left(\frac{p}{q}\right)^n = \frac{1}{\left(\frac{p}{q}\right)^{n-m}} \text{ if } m < n \right]$$

$$\text{III} \quad \left(\frac{1}{2}\right)^{100} \div \left(\frac{1}{2}\right)^{100}$$

$$\text{sol} \quad = \left(\frac{1}{2}\right)^{100-100} = \left(\frac{1}{2}\right)^0 = 1$$

$$\left[\left(\frac{p}{q}\right)^m \div \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m-n}, \left(\frac{p}{q}\right)^0 = 1 \right]$$

$$\text{IV} \quad \left[\left(\frac{-2}{3}\right)^3 \times \left(\frac{-2}{3}\right) \right] \div \left(\frac{4}{9}\right)^2$$

$$\text{sol} \quad = \left[\left(\frac{-2}{3}\right)^{3+1} \right] \div \left(\frac{4}{9}\right)^2$$

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

$$= \left(\frac{2}{3}\right)^4 \div \left(\frac{2}{3}\right)^4 = \left(\frac{2}{3}\right)^{4-4} = \left(\frac{2}{3}\right)^0 = 1$$

$$\left[\left(\frac{p}{q}\right)^m \times \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m+n}, \left(\frac{p}{q}\right)^0 = 1 \right]$$

7. T/F [need not to do in copy]

8. what is value of $\frac{5 \times 10^3 \times 4 \times 10^5}{2}$

$$= \frac{5 \times 4 \times 10^3 \times 10^5}{2} = \frac{10 \times 10^3 \times 10^5}{2}$$

$$= \frac{10^{1+3+5}}{2} = \frac{10^9}{2}$$

H-w parts of QNo 2, 3, 4, 5, and 6

Let us do 2-2

B-1 Express the following with positive exponent:

(i) $\left(\frac{2}{3}\right)^{-6}$ (ii) $\left(\frac{19}{27}\right)^{-2}$ (iii) $\left(\frac{-2}{5}\right)^{-7}$

(iv) $(-5)^{-2}$ (v) $\left(\frac{-5}{7}\right)^6$

sol: we know that $\left(\frac{p}{q}\right)^{-m} = \frac{1}{\left(\frac{p}{q}\right)^m} = \frac{q^m}{p^m}$

\therefore (i) $\left(\frac{2}{3}\right)^{-6} = \left(\frac{3}{2}\right)^6$

(ii) $\left(\frac{19}{27}\right)^{-2} = \left(\frac{27}{19}\right)^2$

iii $\left(\frac{-2}{5}\right)^{-7} = \left(\frac{-5}{2}\right)^7$

iv $(-5)^{-2} = \left(\frac{-1}{5}\right)^2$

v $\left(\frac{-5}{7}\right)^6 = \left(\frac{-7}{5}\right)^6$

2 Simplify the following and express with positive exponent.

(i) $\left(\frac{1}{9}\right)^3 \times \left(\frac{1}{9}\right)^{-5}$

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

II $\left(\frac{-2}{7}\right)^{-3} \times \left(\frac{-2}{7}\right)^{-4}$

Sol $\left(\frac{-2}{7}\right)^{-3} \times \left(\frac{-2}{7}\right)^{-4} = \left(\frac{-2}{7}\right)^{-3+(-4)} = \left(\frac{-2}{7}\right)^{-7} = \left(\frac{7}{-2}\right)^7$

$\left(\frac{p}{q}\right)^m \times \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m+n}$; $\left(\frac{p}{q}\right)^{-m} = \frac{1}{\left(\frac{p}{q}\right)^m} = \left(\frac{q}{p}\right)^m$

VII $(8)^{-3} \times \left(\frac{-1}{2}\right)^{-3}$

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

$\left(\frac{p}{q}\right)^m \times \left(\frac{r}{s}\right)^m = \left(\frac{p \times r}{q \times s}\right)^m$; $\left(\frac{p}{q}\right)^{-m} = \left(\frac{q}{p}\right)^m$

VIII $\left(\frac{5}{12}\right)^{-5} \div \left(\frac{5}{12}\right)^{-5}$

Sol $\left(\frac{5}{12}\right)^{-5-(-5)} = \left(\frac{5}{12}\right)^{-5+5} = \left(\frac{5}{12}\right)^0 = 1$

$\left(\frac{p}{q}\right)^m \div \left(\frac{p}{q}\right)^n = \left(\frac{p}{q}\right)^{m-n}$; $\left(\frac{p}{q}\right)^0 = 1$

I Find value of

cu $(2^{-1} \times 4^{-1}) \div 2^{-2}$

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

$$\left[\left(\frac{p}{q}\right)^{-m} = \left(\frac{q}{p}\right)^m\right]$$

II $\left(\frac{1}{2}\right)^{-2} + \left(\frac{1}{3}\right)^{-2} + \left(\frac{1}{4}\right)^{-2}$

sol $= (2)^2 + (3)^2 + 4^2$
 $= 4 + 9 + 16$
 $= 13 + 16$
 $= ~~16~~ 29$

$$\left[\left(\frac{p}{q}\right)^{-m} = \left(\frac{q}{p}\right)^m\right]$$

III $\left\{5^{-1} + \left(\frac{1}{2}\right)^{-2} + 2^{-1}\right\}^0$

$= \left\{\frac{1}{5} + 2^2 + \frac{1}{2}\right\}^0$

$= \left\{\frac{1}{5} + 4 + \frac{1}{2}\right\}^0 = \left\{\frac{2+40+5}{10}\right\}^0 = \left(\frac{47}{10}\right)^0 = 1$

$$\left[\left(\frac{p}{q} \right)^{-m} = \left(\frac{q}{p} \right)^m, \left(\frac{p}{q} \right)^0 = 1 \right]$$

4. Simplify

(1) $\frac{18 \times p^{-3}}{3^{-2} \times 10^2 \times p^{-5}} \quad (p \neq 0)$

Sol $= \frac{3^2 \times 10^2 \times p^5}{18 \times p^3} = \frac{9 \times 100 \times p^{5-3}}{18 \times p}$

$$\left[\left(\frac{p}{q} \right)^{-m} = \left(\frac{q}{p} \right)^m; \left(\frac{p}{q} \right)^m \div \left(\frac{p}{q} \right)^n = \left(\frac{p}{q} \right)^{m-n} \right]$$

5/ Find m if $\left(\frac{3}{7} \right)^5 \times \left(\frac{3}{7} \right)^{-2} = \left(\frac{3}{7} \right)^m$

Sol L.H.S $\left(\frac{3}{7} \right)^5 \times \left(\frac{3}{7} \right)^{-2} = \left(\frac{3}{7} \right)^{5-2} = \left(\frac{3}{7} \right)^3$

$$\left(\frac{3}{7} \right)^3 = \left(\frac{3}{7} \right)^m$$

$\therefore m = 3$ (On equating base and exponent)

8/ Find x if $\left(\frac{2}{3} \right)^{-5} \times \left(\frac{2}{3} \right)^{12} = \left(\frac{2}{3} \right)^{3x-2}$

Sol $\left(\frac{2}{3} \right)^{-5+12} = \left(\frac{2}{3} \right)^{3x-2}$

(On equating base and exponent)

$$\left(\frac{2}{3} \right)^7 = \left(\frac{2}{3} \right)^{3x-2}$$

$$2x - 2 = 7$$

$$3x = 7 + 2$$

$$3x = 9$$

$$x = \frac{9}{3} = 3$$

9 Find the value of x^{-2} if $x = \left(\frac{-3}{7}\right)^{-5} \div \left(\frac{11}{14}\right)^0$

Sol. $x = \left(\frac{-3}{7}\right)^{-5} \div \left(\frac{11}{14}\right)^0$

$$x = \left(\frac{-7}{3}\right)^5 \div 1$$

$$x = \left(\frac{-7}{3}\right)^5$$

$$x^{-2} = \left[\left(\frac{-7}{3}\right)^5\right]^{-2} = \left(\frac{-7}{3}\right)^{-10} = \left(\frac{-3}{7}\right)^{10}$$

11 Simplify $\left(\frac{6}{7}\right)^2 \times \left(\frac{6}{7}\right)^{-5} \times \left(\frac{1}{2}\right)^{-3} \times \left(\frac{3}{5}\right)^{-3}$

Sol. $\left(\frac{6}{7}\right)^2 \times \left(\frac{6}{7}\right)^{-5} \times \left(\frac{1}{2}\right)^{-3} \times \left(\frac{3}{5}\right)^{-3}$

$$= \left(\frac{6}{7}\right)^{2+(-5)} \times \left(\frac{1}{2} \times \frac{3}{5}\right)^{-3}$$

$$= \left(\frac{6}{7}\right)^{-3} \times \left(\frac{3}{10}\right)^{-3}$$

$$= \left(\frac{6}{7} \times \frac{3}{10}\right)^{-3} = \left(\frac{18}{70}\right)^{-3} = \left(\frac{35}{18}\right)^3 = \frac{35^3}{18^3}$$

12 Simplify $\left(\frac{2}{3}\right)^3 \times \left(\frac{2}{3}\right)^{-2} \times \left[\left(\frac{1}{2}\right)^2\right]^{-2} \times \frac{1}{24}$

$$= \left(\frac{2}{3}\right)^{3+(-2)} \times \left(\frac{1}{2}\right)^{-4} \times \frac{1}{24}$$

$$\frac{2}{3} \times 2^4 \times \frac{1}{24}$$

$$\frac{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 1}{3 \times 24 \times 6 \times 3} = \frac{2}{9}$$

13 If $(18)^{10} = 4^5 \cdot 3^x$ then find the value of x

Sol $(18)^{10} = 4^5 \cdot 3^x$

$$(2 \times 9)^{10} = 4^5 \cdot 3^x$$

$$(2 \times 3^2)^{10} = 4^5 \cdot 3^x$$

$$(2 \times 3^2)^{10} = (2^2)^5 \cdot 3^x$$

$$\frac{2^{10} \times 3^{20}}{2^{10}} = 3^x$$

$$x = 20$$

on equating base and exponent

Hw Parts of QNO-2, 3

QNO 6, 7 and QNO-10

B-1

Let us do 2.3
Express the following numbers in Standard form:

(1)

Sol

$$0.00000007 = \frac{7}{100000000} = 7 \times 10^{-8}$$

II

$$0.0000000000000036$$

Sol

$$\frac{36}{100000000000000} = 36 \times 10^{-14} = 3.6 \times 10^{-13}$$

V

$$832000000000 = 8.32 \times 10^{11}$$

VI

$$735419201 = 7.35419201 \times 10^8$$

(2)

Express the following in usual form

(i)

$$2.1 \times 10^{-7}$$

Sol

$$2.1 \times 10^{-7} = \frac{21}{10 \times 10^7} = \frac{21}{10^8} = 0.00000021$$

II

$$5.07 \times 10^{-8}$$

$$5.07 \times 10^{-8} = \frac{507}{10^2 \times 10^8} = \frac{507}{10^{10}} = 0.000000507$$

III

$$4.932 \times 10^{-12}$$

$$4.932 \times 10^{-12} = \frac{4932}{1000 \times 10^{12}} = \frac{4932}{10^8 \times 10^{12}}$$

0.00000000004932

3 Express the numbers appearing in the following statements in standard form

(i) Average diameter of a red blood cell is 0.000007 mm

Sol $\frac{7}{1000000} = 7.0 \times 10^{-6}$ mm

ii The size of a plant cell is 0.00001275 m

Sol $\frac{1275}{10^8} = 1.275 \times 10^{-5}$ m

4 Diameter of wire on a computer chip is 3×10^{-6} m Express it in usual form

Sol $\frac{3}{10^6} = 0.000003$ m

Hw parts of QNo \rightarrow 1, 2, 3 & QNo 5