

VIII Homework - 18th Feb (Exponents and Powers)

- 1) The value of $\left(\frac{3}{5}\right)^{-3}$ is — (a) $\frac{27}{125}$ (b) $\frac{125}{27}$ (c) $\frac{9}{15}$ (d) $\frac{27}{25}$
- 2) The value of x for the expression $\left(\frac{7}{9}\right)^{-4} \times \left(\frac{7}{9}\right)^{3x} = \left(\frac{9}{7}\right)^{-5}$ is
(a) 3 (b) -2 (c) -3 (d) 1
- 3) The value of $\left(\frac{4}{9}\right)^{-3} \times \left(\frac{-3}{2}\right)^{-3} =$ — (a) $\frac{27}{8}$ (b) $\left(\frac{2}{3}\right)^3$ (c) $-\frac{27}{8}$ (d) $-\frac{9}{4}$
- 4) On simplifying $\left(\frac{1}{2}\right)^{-2} + \left(\frac{2}{3}\right)^{-2} - \left(\frac{3}{4}\right)^{-2}$, we get
(a) $\frac{35}{36}$ (b) $\frac{161}{36}$ (c) $-\frac{1}{6}$ (d) $\frac{23}{36}$
- 5) The value of $\left[\left(\frac{-3}{7}\right)^2\right]^{-1} =$ (a) $\frac{9}{49}$ (b) $-\frac{9}{49}$ (c) $-\frac{7}{9}$ (d) $\frac{49}{9}$
- 6) If $2^{x+5} = 4^{x-1}$, then $x =$ (a) 6 (b) 7 (c) 4 (d) $\frac{3}{2}$
- 7) The value of $\left[\left(\frac{-1}{3}\right)^2\right]^{-2} =$ (a) $\frac{1}{81}$ (b) $\frac{1}{27}$ (c) $-\frac{1}{81}$ (d) $\frac{1}{243}$
- 8) The value of $\left[(2961)^0\right]^{-2}$ is equal to
(a) $\frac{1}{(2961)^2}$ (b) -2 (c) 2961 (d) 1
- 9) If $5^{2x} \div 5^{-3} = 5^7$, then $x =$ (a) 2 (b) 5 (c) $\frac{1}{5}$ (d) 3
- 10) The value of $\left(\left(\frac{2}{3}\right)^2\right)^3 =$ (a) $\left(\frac{2}{3}\right)^5$ (b) $\left(\frac{2}{3}\right)^{12}$ (c) $\left(\frac{2}{3}\right)^6$ (d) $\left(\frac{2}{3}\right)^{-5}$
- 11) $a^3 \times b^3 =$ (a) $(a \times b)^9$ (b) $(a \times b)^6$ (c) $(a \times b)^3$ (d) $\left(\frac{a}{b}\right)^3$
- 12) $\left(\frac{3}{2}\right)^{-4}$ can be written as (a) $\left(\frac{2}{3}\right)^4$ (b) $\left(\frac{-3}{2}\right)^{-4}$ (c) $\left(\frac{-2}{3}\right)^4$ (d) $\left(\frac{3}{2}\right)^4$
- 13) The value of $\left(\frac{1}{3}\right)^3 \div \left(\frac{1}{3}\right)^7 =$ (a) $\frac{1}{27}$ (b) $\frac{1}{81}$ (c) 81 (d) 27
- 14) 2.036×10^{-6} in usual form is
(a) 0.00002036 (b) 0.000002036 (c) 0.2036000 (d) 203600
- 15) 100.08 in standard form is
(a) 1.0008×10^2 (b) 1.0008×10^3 (c) 1.0008×10^4 (d) none of these.

(T/F)? Justify

1) $3^7 \times 3^3 = 3^{-21}$
2) $(5^2)^{-3} = 5^{-6}$

5) $(a^{-2})^3 = a^{-6}$

6) $(\frac{3}{2})^{-4} = (\frac{2}{3})^4$

3) $2^{-2} \times 3^{-2} = 6^{-4}$

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

4) $\frac{2^{-5}}{4^{-5}} = 2^5$

Fill in the blanks :-

1) $2^{-6} \times \underline{\hspace{2cm}} = 2^3$

4) $10^{-3} \times \frac{1}{10^{-4}} = \underline{\hspace{2cm}}$

2) $3^5 \div \underline{\hspace{2cm}} = 3^7$

5) $(a^{-3})^4 = a^{\underline{\hspace{2cm}}}$

3) $\underline{\hspace{2cm}} - (32)^0 = 1$

6) $(\frac{1}{3})^0 = \underline{\hspace{2cm}}$

Answer the following :-

1) Evaluate : $(\frac{x^n}{x^p})^m \times (\frac{x^p}{x^m})^n \times (\frac{x^m}{x^n})^p$

2) Solve for x : (i) $x^5 \div \frac{1}{x^{-3}} = 49$

(ii) $11^{4x} \times 11^{-3} = 11 \times (121)^4$

3) Evaluate : (i) $(\frac{3}{2})^6 \times (\frac{3}{2})^{-4}$ (ii) $(\frac{7}{9})^7 \div (\frac{9}{7})^{-5}$

4) Simplify the following :- (i) $(\frac{-1}{4})^2$ (ii) $\left[(\frac{-1}{3})^2 \right]^{-2}$

5) Simplify $(7^{-1} \times 3^{-1}) \div 7^{-1}$

6) Find the value of x :

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

(ii) $(\frac{2}{7})^{-x} \div (\frac{2}{7})^{-3} = (\frac{2}{7})^5$

7) By what number should $(4)^{-1}$ be multiplied so that the product is equal to $(-5)^{-1}$?

8) If $x = (\frac{5}{3})^2 \times (\frac{3}{5})^{-3}$, find the value of x^{-2} .

9) By what number should $\left(-\frac{2}{3}\right)^{-3}$ be divided so that the quotient is $\left(\frac{9}{8}\right)^2$?

10) Simplify: $\frac{8^{-2} \times 10^{-4}}{2^{-5} \times 5^{-4} \times 2^{-2}}$

11) Simplify: $\frac{(49)^{5/2} - (49)^{7/2}}{(49)^{7/2}}$

12) Solve for x : $\frac{5^{2x} \times 5}{5^{3x-2}} = (25)^{-2}$

VIII

Homework - 18th Feb [Answers]

$$1) \left(\frac{3}{5}\right)^{-3} = \left(\frac{5}{3}\right)^3 = \frac{125}{27} \quad (b)$$

$$2) \left(\frac{7}{9}\right)^{-4} \times \left(\frac{7}{9}\right)^{3x} = \left(\frac{7}{9}\right)^5$$

$$\therefore -4 + 3x = 5$$

$$3x = 9$$

$$x = 3 \quad (a)$$

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

$$= -\frac{27}{8} \quad (c)$$

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

$$= \frac{144 + 81 - 64}{36} = \frac{161}{36} \quad (b)$$

$$5) \left(\frac{-3}{7}\right)^{-2} = \left(\frac{-7}{3}\right)^2 = \frac{49}{9} \quad (d)$$

$$6) 2^{x+5} = 2^{2(x-1)}$$

$$\therefore x+5 = 2(x-1)$$

$$\Rightarrow x+5 = 2x-2$$

$$\Rightarrow x-2x = -2-5$$

$$\Rightarrow -x = -7$$

$$\therefore x = 7 \quad (b)$$

$$7) \left(\frac{-1}{3}\right)^{2x-2x-1} = \left(\frac{-1}{3}\right)^4 = \frac{1}{81} \quad (a)$$

$$8) (2961)^{0x-2} = (2961)^0 = 1 \quad (d)$$

$$9) 5^{2x-(-3)} = 5^7$$

$$5^{2x+3} = 5^7$$

$$\therefore 2x+3 = 7$$

$$2x = 4$$

$$x = 2 \quad (a)$$

$$10) \left(\frac{2}{3}\right)^6 \quad (c)$$

$$11) (a \times b)^3 (c)$$

$$12) \left(\frac{3}{2}\right)^{-4} = \left(\frac{2}{3}\right)^4 (a)$$

$$13) \left(\frac{1}{3}\right)^{3-7} = \left(\frac{1}{3}\right)^{-4} = 3^4 = 81 (c)$$

$$14) 0.000002036 (b)$$

$$15) 1.0008 \times 10^{12} (a)$$

T/F

$$1) \text{ LHS, } 3^7 \times 3^{-3} = 3^{7-3} = 3^4 \neq 3^{-21} \text{ False}$$

$$2) (5^2)^{-3} = 5^{-6} \text{ True}$$

$$3) (2 \times 3)^{-2} = 6^{-2} \neq 6^{-4} \text{ False}$$

$$4) \frac{2^{-5}}{4^{-5}} = \left(\frac{2}{4}\right)^{-5} = \left(\frac{1}{2}\right)^{-5} = 2^5 \text{ True}$$

$$5) (a^{-2})^3 = a^{-6} \text{ True}$$

$$6) \left(\frac{3}{2}\right)^{-4} = \left(\frac{2}{3}\right)^4 \text{ True}$$

$$7) 2^{-1} + 3^{-1} = \frac{1}{2} + \frac{1}{3} = \frac{3+2}{6} = \frac{5}{6} \neq \frac{6}{5} \text{ False}$$

Fill in the blanks

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

$$x = \frac{2^3}{2^{-6}} = 2^3 \times 2^6 = 2^9$$

$$2) 3^5 \div x = 3^7$$

$$\frac{3^5}{x} = 3^7$$

$$\frac{3^5}{3^7} = x$$

$$x = 3^{5-7} = 3^{-2}$$

$$3) x - 1 = 1$$

$$x = 1 + 1 = 2$$

$$4) \frac{10^{-3}}{10^4} = 10^{-3+4} = 10$$

$$5) \underline{\underline{a^{-12}}}$$

$$6) \left(\frac{1}{3}\right)^0 = \underline{\underline{1}}$$

Answer the following:-

$$1) \frac{x^{nm}}{x^{pn}} \times \frac{x^{pn}}{x^{mn}} \times \frac{x^{mp}}{x^{np}} = \underline{\underline{1}}$$

$$2) (i) x^5 \times x^{-3} = 49 \\ \Rightarrow x^{5-3} = 7^2 \\ \Rightarrow x^2 = 7^2 \\ \therefore x = \underline{\underline{7}}$$

$$(ii) 11^{4x-3} = 11 \times 11^{2 \times 4} \\ 11^{4x-3} = 11 \times 11^8 \\ 11^{4x-3} = 11^9 \\ \therefore 4x-3 = 9 \\ 4x = 12 \\ x = \underline{\underline{3}}$$

$$3) (i) \left(\frac{3}{2}\right)^{6-4} = \left(\frac{3}{2}\right)^2 = \frac{9}{4}$$

$$(ii) \left(\frac{7}{9}\right)^7 \div \left(\frac{7}{9}\right)^5 = \left(\frac{7}{9}\right)^{7-5} = \left(\frac{7}{9}\right)^2 = \frac{49}{81}$$

$$4) (i) \left(-\frac{1}{4}\right)^{-4} = (-4)^4 = \underline{\underline{256}}$$

$$(ii) \left(-\frac{1}{3}\right)^{2x-2x-1} = \left(-\frac{1}{3}\right)^{-1} = \underline{\underline{\frac{1}{3}}}$$

$$5) \left(\frac{1}{7} \times \frac{1}{3}\right) \div \frac{1}{7} = \frac{1}{3} \times \frac{7}{7} = \underline{\underline{\frac{1}{3}}}$$

$$6) (i) \left(\frac{4}{3}\right)^{-5-4} = \left(\frac{3}{4}\right)^{-(2x+1)}$$

$$\Rightarrow \left(\frac{4}{3}\right)^{-9} = \left(\frac{4}{3}\right)^{2x+1}$$

$$\therefore -9 = 2x+1$$

$$2x = -9-1 = -10$$

$$x = \underline{\underline{-5}}$$

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

$$\therefore -x+3 = 5$$

$$-x = 2$$

$$x = \underline{\underline{-2}}$$

7) Let the number be x .

$$4^{-1} \times x = (-5)^{-1}$$

$$\frac{x}{4} = -\frac{1}{5}$$

$$\therefore x = \underline{\underline{-\frac{4}{5}}}$$

Hence, the required number is $-\frac{4}{5}$

$$8) \quad x = \left(\frac{5}{3}\right)^2 \times \left(\frac{5}{3}\right)^3$$

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

$$\therefore x^{-2} = \left(\frac{5}{3}\right)^{5 \times -2} = \left(\frac{5}{3}\right)^{-10} = \underline{\underline{\left(\frac{3}{5}\right)^{10}}}$$

9) Let the number be x

$$\left(-\frac{2}{3}\right)^{-3} \div x = \left(\frac{9}{8}\right)^2$$

$$\left(-\frac{3}{2}\right)^3 \div x = \frac{81}{64}$$

$$-\frac{27}{8} \times \frac{1}{x} = \frac{81}{64}$$

$$\therefore \frac{1}{x} = \frac{81}{64} \times -\frac{8}{27}$$

$$= -\frac{3}{8}$$

$$x = \underline{\underline{-\frac{8}{3}}}$$

$$10) \quad \frac{(2^3)^{-2} \times (2 \times 5)^{-4}}{2^{-5} \times 5^{-4} \times 2^{-2}} = \frac{2^{-6} \times 2^{-4} \times 5^{-4}}{2^{-5} \times 5^{-4} \times 2^{-2}} = 2^{-6-4+5+2} = 2^{-3} = \frac{1}{2^3} = \underline{\underline{\frac{1}{8}}}$$

$$11) \quad \frac{7^{2 \times \frac{5}{2}} - 7^{2 \times \frac{1}{2}}}{7^{2 \times \frac{1}{2}}} = \frac{7^5 - 7^1}{7^1} = \frac{7^5 - 7^1}{7^1} = \frac{7^5(1 - 7^{-4})}{7^1} = 7^{5-1} (1 - 49) = 7^{-2} \times -48 = \frac{-48}{7^2} = \underline{\underline{-\frac{48}{49}}}$$

$$12) \quad \frac{5^{2x+1}}{5^{3x-2}} = 5^{2x-2}$$

$$\Rightarrow 5^{2x+1-3x+2} = 5^{-4}$$

$$\Rightarrow 5^{-x+3} = 5^{-4}$$

$$\therefore -x+3 = -4$$

$$-x = -7$$

$$x = \underline{\underline{7}}$$