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chapter-2

Exponents Rational and Powers

Laws of Exponents or Laws of Indices

Rule No-1

$a^m \times a^n = a^{m+n}$

Rule No-2

$\frac{a^m}{a^n} = a^{m-n}$

Rule No-3

$\frac{a^m}{a^n} = \frac{1}{a^{n-m}}$ and $\frac{a^m}{a^n} = a^{n-m}$

Rule No-4

$(a^m)^n = a^{m \times n}$

Rule No-5

$a^{-m} = \frac{1}{a^m}$ and $\frac{1}{a^{-m}} = a^m$

Rule No-6

$a^0 = 1$

Rule No-7

a) $(xy)^m = x^m y^m$

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b.) $\left(\frac{x}{y}\right)^m = \frac{x^m}{y^m}$

Rule No-8

$x^m = x^n$

Exercise 2-A

Q-1 Simplify :-

i) $a^6 \times a^8$

a^{8+6}

a^{14}

ii.) $x^5 \times x^{-3}$

$x^{5+(-3)}$

x^{5-3}

x^2

iii.) $z^9 \times z^3 \times z^{-6}$

$= z^{9+3-6}$

$= z^{12-6}$

$= z^6$

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iv.) $a^2b^3 \times a^5b^2$

$= (a^2 \times a^5) \times (b^3 \times b^2)$

$= (a^{2+5}) \times (b^{3+2})$

$= (a^7) \times (b^5)$

$= a^7b^5$

v.) $5x^7 \times 3x^4$

$5 \times 3x^{7+4}$

$15x^{11}$

vi.) $p^3q^4 \times p^5q^{-5}$

$= (p^3 \times p^5) \times (q^4 \times q^{-5})$

$= (p^{3+5}) \times (q^{4+(-5)})$

$= (p^8) \times (q^{-1})$

$= p^8q^{-1} = \frac{p^8}{q}$

vii.) $x^7y^{-5} \times x^{-5}y^3$

$= (x^7 \times x^5) \times (y^{-5} \times y^3)$

$= (x^{7+(-5)}) \times (y^{-5+3})$

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$= (x^2) \times (y^{-2})$

$= x^2 y^{-2} = \frac{x^2}{y^2}$

viii.) $x^{-2} y^5 \times 0^x y^{-7}$

$= (x^{-2} \times x^0) \times (y^5 \times y^{-7})$

$= (x^{-2+0}) \times (y^{5+(-7)})$

$= (x^{-2}) \times (y^{-2})$

$= x^{-2} y^{-2} = \frac{1}{x^2 y^2}$

ix.) $x^6 y^4 z^{-2} \times x^{-3} y^{-5} z^{-1} \times x^2 z^4$

$= (x^6 \times x^{-3} \times x^2) \times (y^4 \times y^{-5}) \times (z^{-2} \times z^4 \times z^{-1})$

$= (x^{6+(-3)+2}) \times (y^{4+(-5)}) \times (z^{-2+(-1)+4})$

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

$= x^5 y^{-1} z^1 = \frac{x^5 z}{y}$

Ques 2 Simplify:-

i.) $\frac{x^{12}}{x^4}$

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$= x^{12-7}$

$= x^{5}$

ii) $\frac{z^{6}}{z^{-3}}$

$= z^{6-(-3)}$

$= z^{6+3}$

$= z^{9}\ z^{9}$

iii) $\frac{m^{5}n^{3}}{m^{2}n^{-4}}$

$= (m^{3}) \times (n^{3+4})$

$= (m^{3}) \times (n^{7})$

$= m^{3}n^{7}$

iv) $18x^{9} \div 6x^{7}$

$= \frac{\overset{3}{\cancel{18}}\ x^{9}}{\cancel{6}\ x^{7}}$

$= 3 \times x^{9-7}$

$= 3x^{2}$

v) $7a^{12} \div 56a^{15}$

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$\frac{7a^{12}}{856a^{15}}$

$\frac{1}{8}a^{12-15}$

$\frac{1}{8}a^{-3} = \frac{1}{8a^3}$

vi) $a^{13}b^7 \div a^5b^{-3}$

$(a^{13} \times a^5) \times (b^7 \times b^{-3})$

$= (a^{13-5}) \times (b^{7-(-3)})$

$= (a^8) \times (b^{7+3})$

$= (a^8) \times (b^{10})$

$= a^8b^{10}$

vii) $7x^{14} \div 21x^{-10}$

$\frac{7x^{14}}{21x^{-10}}$

$= \frac{1}{3} \times x^{14-(-10)}$

$= \frac{1}{3} \times x^{14+10}$

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$= \frac{1}{3} \times x^{24}$

$= \frac{x^{24}}{3}$

viii.) $p^{11} \div p^{11}$

$\frac{p^{11}}{p^{11}} \Rightarrow p^{11-11} = p^0 = 1$

ix.) $\frac{a^7 b^5 c^4}{a^{-2} b^3 c^6}$

$= (a^{7-(-2)}) \times (b^{5-3}) \times (c^{4-6})$

$= (a^{7+2}) \times (b^{5-3}) \times (c^{4-6})$

$= (a^9) \times (b^2) \times (c^{-2})$

$= \frac{a^9 b^2}{c^2}$

Ques3 Simplify :-

(i) $(a^3)^2$

$= a^{3 \times 2}$

a^6

ii.) $(2x^2 y)^4$

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$= (2^4 x^{2\times4}) y^4$

$= 2^4 x^8 y^4$

$= 16 x^8 y^4$

ii.) $(m^2 n^{-3})^4$

$= (m^{2\times4}) \times (n^{-3\times4})$

$= m^8 n^{-12}$

$= \frac{m^8}{n^{-12}}$

iv.) $(x^2 y^{-3})^{-2}$

$(x^{2\times-2}) \times (y^{-3\times-2})$

$= x^{-4} y^6$

$= \frac{y^6}{x^4}$

v.) $(3x^3 y^{-3})^2$

$= (-3x^{3\times2}) \times (y^{-3\times2})$

$= 3x^6 y^{-6}$

$= \frac{9x^6}{y^6}$

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vi) $(5m^4n^{-3})^3$

$= (5^3 m^{4\times3}) \times (n^{-3\times3})$

$= 5^3 m^{12} n^{-9}$

$= \frac{125m^{15}}{n^9}$

Ques-4 Evaluate:-

i) $(36)^{1/2}$

$= (2\times2\times3\times3)^{\frac{1}{2}}$

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

$= 2^{\cancel{2}\times\frac{1}{\cancel{2}}} \times 3^{\cancel{2}\times\frac{1}{\cancel{2}}}$

$= 2^1 \times 3^1$

$= 2\times3 = 6$

ii) $(27)^{2/3}$

$= (3\times3\times3)^{2/3}$

$= (3^3)^{2/3}$

$= 3^{\cancel{3}\times\frac{2}{\cancel{3}}}$

$= 3^2 = 9$

iii) $(16)^{-3/4}$

$= (2\times2\times2\times2)^{-3/4}$

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$= (2^4)^{-3/4}$

$= 2^{4 \times -\frac{3}{4}}$

$= 2^{-3} = \frac{1}{2^3} = \frac{1}{8}$

iv.) $(64)^{-1/3}$

$(2 \times 2 \times 2 \times 2 \times 2 \times 2)^{-1/3}$

$= (2^6)^{-1/3}$

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

$= \frac{1}{2^2} = \frac{1}{4}$

v.) $(81)^{-1/4}$

$(3 \times 3 \times 3 \times 3)^{-1/4}$

$(3^4)^{-1/4}$

$3^{4 \times -\frac{1}{4}}$

$3^{-1} = \frac{1}{3}$

vi.) $(32)^{-4/5}$

$(2 \times 2 \times 2 \times 2 \times 2)^{-4/5}$

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$= (2^5)^{-4/5}$

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

$\cdot 2^{-4} = \frac{1}{2^4} = \frac{1}{16}$

Ques 5 Simplify:-

(i) $(25a^2)^{1/2}$

$= (5^2 a^2)^{\frac{1}{2}}$

$= 5^{2 \times \frac{1}{2}} \times a^{2 \times \frac{1}{2}}$

$= 5^1 a^1 = 5a$

ii.) $(27x^{-3})^{1/3}$

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

$= 3^{3 \times \frac{1}{3}} \times x^{-3 \times \frac{1}{3}}$

$= 3^1 \times x^{-1}$

$= \frac{3}{x}$

iii.) $(64m^{-6}n^3)^{2/3}$

$(2^6 \times m^{-6} \times n^3)^{2/3}$

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$\cdot 2^{\frac{1}{2}+\frac{3}{2}} \times m^{-\frac{1}{2}+\frac{1}{2}} \times n^{\frac{1}{2}+\frac{1}{2}}$

$\cdot 2^{\frac{1+3}{2}} \times m^{\frac{-1+1}{2}} n^{\frac{1+1}{2}}$

$\cdot 2^{4} m^{0} n^{1}$

$\cdot \frac{16 m^{2} n^{2}}{m^{4}} \quad \cdot \frac{16 m^{2}}{m^{4}}$

$(81 a^{4} b^{8} c^{-4})^{1/4}$

$(3^{4} \times a^{4} \times b^{8} \times c^{-4})^{1/4}$

$\cdot 3^{4 \times \frac{1}{4}} \times a^{4 \times \frac{1}{4}} \times b^{8 \times \frac{1}{4}} \times c^{-4 \times \frac{1}{4}}$

$\cdot 3^{1} a^{1} b^{2} c^{-1}$

$\cdot \frac{3ab^{2}}{c}$

$(3x^{-3} y^{3})^{-2}$

$(3^{1} x^{-3} y^{3})^{-2}$

$3^{1 \times -2} x^{-3 \times (-2)} y^{3 \times (-2)}$

$3^{-2} x^{6} y^{-6}$

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

$(6ab^{2} c^{-3})^{-1}$

$(6^1 \times a^1 \times b^2 \times c^{-3})^{-1}$

$= 6^{1\times-1} \times a^{1\times(-1)} \times b^{2\times-1} \times c^{-3\times-1}$

$= 6^{-1} a^{-1} b^{-2} c^{3}$

$= \frac{c^3}{6ab^2}$

vii) $(-3a^{3/4} b^{-1/4})^4$

$(-3)^{1\times4} \times a^{\frac{3}{4}\times4} \times b^{-\frac{1}{4}\times4}$

$-3^4 \times a^3 \times b^{-1}$

$= \frac{81a^3}{b}$

viii) $(32a^{10} b^{-5})^{1/5}$

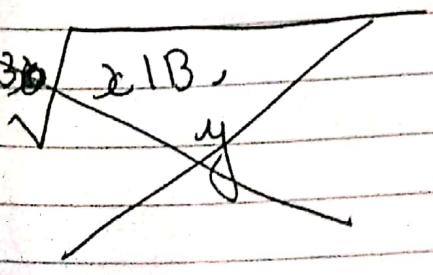
$(2^5 \times a^{10} \times b^{-5})^{1/5}$

$= 2^{5\times\frac{1}{5}} \times a^{10\times\frac{1}{5}} \times b^{-5\times\frac{1}{5}}$

$= 2^1 a^2 b^{-1}$

$= \frac{2a^2}{b}$

ix) 30 $\angle$ 1B,



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9x.) $\sqrt[3]{x^{18} y^{-12} z^{3}}$

$= (x^{18} \times y^{-12} \times z^{3})^{1/3}$

$= (x^{18 \times \frac{1}{3}} \times y^{-12 \times \frac{1}{3}} \times z^{3 \times \frac{1}{3}})$

$= x^{6} \times y^{-4} \times z^{1}$

$= \frac{x^6 z}{y^4}$

Quest6 Show that:-

i) $\frac{x^{m+n} \times x^{n+l} + x^{l+m}}{(x^m \times x^n \times x^l)^2} = 1$

$= \frac{x^{2m+2n+2l}}{x^{2m} \times x^{2n} \times x^{2l}} = 1$

$= x^{2m+2n+2l-2m-2n-2l} = 1$

$= x^0 = 1 \quad = 1$

LHS = RHS

Hence Verified

ii) $\sqrt{x^{p-q}} \times \sqrt{x^{q-r}} \times \sqrt{x^{r-p}} = 1$

$= \sqrt{x^{p-q}} \times \sqrt{x^{q-r}} \times \sqrt{x^{r-p}} = 1$

$= \sqrt{x^{p-q} \times x^{q-r} \times x^{r-p}} = 1$

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$= \sqrt{x^{(p-q)+(q-r)+(r-p)}} = 1$

$= \sqrt{x^{p-q+q-r+r-p}} = 1$

$= \sqrt{x^0} = \sqrt{1} = 1$

Ques 7 Show that :- $\left[\frac{x^p}{x^q}\right]^{p+q} \times \left[\frac{x^q}{x^r}\right]^{q+r} \times \left[\frac{x^r}{x^p}\right]^{r+p} = 1$

$= \left[\frac{x^p}{x^q}\right]^{p+q} \times \left[\frac{x^q}{x^r}\right]^{q+r} \times \left[\frac{x^r}{x^p}\right]^{r+p} = 1$

$= \left[\frac{x^p x^r}{x^{q \times r}}\right] \times \left[\frac{x^{q \times p}}{x^{r \times p}}\right] \times \left[\frac{x^{r \times q}}{x^{p \times q}}\right] = 1$

$= \frac{x^{pr+qp}}{x^{pr+qp+rq}}$

$= \frac{x}{x^{qr+rp+pq}} = 1$

$= x^{(pr+rp+qp+rq)-(qr+rp+pq)} = 1$

$= x^{pr+rp+qp+rq-qr-rp-pq}$

$= x^0 = 1$

Ques 8 Show that :-

(i) $(x^{a+b})^{a-b} \times (x^{b+c})^{b-c} \times (x^{c+a})^{c-a} = 1$

$(a+b)(a-b) = a^2-b^2$

$(x^{a+b})^{(a-b)} \times (x)^{(b+c)(b-c)} \times x^{(c+a)(c-a)}$

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$x^{(a^2-b^2)} \times x^{(b^2-c^2)} \times x^{(c^2-a^2)}$

$= x^{(a^2-b^2)+(b^2-c^2)+(c^2-a^2)}$

$x^{a^2-b^2+b^2-c^2+c^2-a^2}$

$= x^0 = 1$

ii) $\left[\frac{x^a}{x^b}\right]^{a-b} \times \left[\frac{x^b}{x^c}\right]^{b-c} \times \left[\frac{x^c}{x^{-a}}\right]^{c-a} = 1$

$= \left[\frac{x^a}{x^b}\right]^{a-b} \times \left[\frac{x^b}{x^c}\right]^{b-c} \times \left[\frac{x^c}{x^{-a}}\right]^{c-a} = 1$

$= \left[x^{a-(-b)}\right]^{(a-b)} \times \left[x^{b-(-c)}\right]^{(b-c)} \times \left[x^{c-(-a)}\right]^{(c-a)}$

$= (x^{a+b})^{a-b} \times (x^{b+c})^{(b-c)} \times (x^{c+a})^{(c-a)}$

$= x^{a^2-b^2} \times x^{b^2-c^2} \times x^{c^2-a^2}$

$= x^{(a^2-b^2+b^2-c^2+c^2-a^2)}$

$= x^{a^2-b^2+b^2-c^2+c^2-a^2}$

$= x^0 = 1$

iii) $\left[\frac{x^{a+b}}{x^c}\right]^{a-b} \times \left[\frac{x^{b+c}}{x^a}\right]^{b-c} \times \left[\frac{x^{c+a}}{x^b}\right]^{c-a} = 1$

$= \frac{x^{(a+b)\times(a-b)}}{x^{c(a-b)}} \times \frac{x^{(b+c)\times(b-c)}}{x^{a(b-c)}} \times \frac{x^{(c+a)\times(c-a)}}{x^{b(c-a)}}$

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$$= \frac{x^{a^2-b^2} \times x^{b^2-c^2} \times x^{c^2-a^2}}{x^{ca-cb} \times x^{ab-ac} \times x^{bc-ba}}$$

$$= \frac{x^{a^2-b^2+b^2-c^2+c^2-a^2}}{x^{ca-cb+ab-ac+bc-ba}}$$

$$= \frac{x^0}{x^0} = \frac{1}{1} = 1$$

iv) $\left[\frac{x^{a^2}}{x^{b^2}}\right]^{\frac{1}{a+b}} \times \left[\frac{x^{b^2}}{x^{c^2}}\right]^{\frac{1}{b+c}} \times \left[\frac{x^{c^2}}{x^{a^2}}\right]^{\frac{1}{c+a}} = 1$

$$= x^{(a-b)(a+b)\times\frac{1}{a+b}} \times x^{(b-c)(b+c)\times\frac{1}{b+c}} \times x^{(c-a)(c+a)\times\frac{1}{c+a}}$$

$$= x^{(a-b)} \times x^{(b-c)} \times x^{(c-a)}$$

$$= x^{a-b+b-c+c-a}$$

$$= x^0 = 1$$

Qus-9 Show that :- $\left[\frac{x^a}{x^b}\right]^{a^2+ab+b^2} \times \left[\frac{x^b}{x^c}\right]^{b^2+bc+c^2} \times \left[\frac{x^c}{x^a}\right]^{c^2+ca+a^2} = 1$

$$\left[\frac{x^a}{x^b}\right]^{a^2+ab+b^2} \times \left[\frac{x^b}{x^c}\right]^{b^2+bc+c^2} \times \left[\frac{x^c}{x^a}\right]^{c^2+ca+a^2}$$

$$x^{(a-b)(a^2+ab+b^2)} \times x^{(b-c)\times(b^2+bc+c^2)} \times x^{((-a)(c^2+(a+a^2)} \times x^{(c^3-a^3)}$$

$$= x^{(a^3-b^3)} \times x^{(b^3-c^3)} \times x^{(c^3-a^3)}$$

$$= x^{a^3-b^3+b^3-c^3+c^3-a^3}$$

$$= x^0 = 1$$

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Question Evaluate :-

(i) $\left[\frac{x^a}{x^b}\right]^{\frac{1}{ab}} \times \left[\frac{x^b}{x^c}\right]^{\frac{1}{bc}} \times \left[\frac{x^c}{x^a}\right]^{\frac{1}{ca}}$

$\frac{x^{a \times \frac{1}{ab}}}{x^{b \times \frac{1}{ab}}} \times \frac{x^{b \times \frac{1}{bc}}}{x^{c \times \frac{1}{bc}}} \times \frac{x^{c \times \frac{1}{ca}}}{x^{a \times \frac{1}{ca}}}$

$= \frac{x \times \frac{1}{b} \times x^{\times \frac{1}{c}} \times x \times \frac{1}{a}}{x^{\times \frac{1}{a}} \times x^{\times \frac{1}{b}} \times x \times \frac{1}{c}}$

$= \frac{x^{\left(\frac{1}{b}+\frac{1}{c}+\frac{1}{a}\right)}}{x^{\left(\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)}}$

$= x^{\frac{1}{b}+\frac{1}{c}+\frac{1}{a}-\frac{1}{a}-\frac{1}{b}-\frac{1}{c}}$

$= x^0 = 1$

(ii) $\frac{1}{1+x^{a-b}} + \frac{1}{1+x^{b-a}}$

$\frac{1}{\frac{1}{1}+\frac{x^a}{x^b}} + \frac{1}{\frac{1}{1}+\frac{x^b}{x^a}}$

$= \frac{1}{\frac{1 \times x^b + x^a \times 1}{x^b}} + \frac{1}{\frac{1 \times x^a + x^b \times 1}{x^a}}$

$= 1 \times \frac{x^b}{x^b + x^a} + 1 \times \frac{x^a}{x^a + x^b}$

$= \frac{x^b}{x^a + x^b} + \frac{x^a}{x^a + x^b} = \frac{x^b + x^a}{x^a + x^b}$

$= \frac{x^b}{x^{b+a}} + \frac{x^a}{x^{a+b}} = \frac{x^b}{x^{a+b}} + \frac{x^a}{x^{a+b}}$

$= \frac{x^b + x^a}{x^a + x^b} = \frac{x^{b+a}}{x^{a+b}}$

$= \frac{x^{a+b}}{x^{a+b}} = 1$

Ques-11 Simplify :- $(ab)^{y-z} \cdot (bc)^{z-x} \cdot (ca)^{x-y}$

$(ab)^{y-z} \cdot (bc)^{z-x} \cdot (ca)^{x-y}$

$\frac{(ab)^y}{(ab)^z} \times \frac{(bc)^z}{(bc)^x} \times \frac{(ca)^x}{(ca)^y}$

$\frac{a^y \times b^y}{a^z \times b^z} \times \frac{b^z \times c^z}{b^x \times c^x} \times \frac{c^x \times a^x}{c^y \times a^y}$

$= \frac{a^x \times b^y \times c^z}{a^z \times b^x \times c^y}$

$= a^{x-z} b^{y-x} c^{z-y}$

Ques-12 Simplify :- $\frac{x^{2n+3} \cdot x^{(2n+1)(n+3)}}{(x^3)^{2n+1} \cdot x^{n(2n+1)}}$

$= \frac{x^{2n+3} \times x^{2n(n+2)+1(n+2)}}{x^{3(2n+1)} \times x^{n(2n+1)}}$

$= \frac{x^{2n+3} \times x^{2n^2+4n+n+2}}{x^{6n+1} \times x^{2n^2+n}}$

$= \frac{x^{2n+3}}{x^{6n+1}} \times \frac{x^{2n^2+5n+2}}{x \cdot x^{n^2+n}}$

$= \frac{x^{2n+3+2n^2+5n+2}}{x^{6n+1+n^2+n}}$

$= \frac{x^{7n+5+2n^2}}{x^{7n+1+n^2}}$

$= x^{7n+5+2n^2-7n-1-n^2}$

$= x^{5-1}$

$= x^4$

Ques 13 Simplify : $\frac{a^{3+2n} \cdot (a^4)^{2n+2}}{(a^3)^{2n+1} \cdot a^4}$

$= \frac{a^{3+2n} \times a^{2 \cdot 2n+2 \times 2}}{a^{6+2n+4+3}}$

$= \frac{a^{3+2n} \times a^{4n+4}}{a^{8n+12}}$

$= \frac{a^{3+2n+4n+4}}{a^{8n+12}}$

$= \frac{a^{7+6n+4}}{a^{8n+12}}$

$= a^{11+8n-8n-12}$

$= a^{-1} = \frac{1}{a}$

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$$= \frac{x^{2n+3} \times x^{2n^2+5n+2}}{x^{6n+1} \times x^{2n^2+n}}$$

$$= \frac{x^{2n+3+2n^2+5n+2}}{x^{6n+1+2n^2+n}}$$

$$= \frac{x^{7n+5+2n^2}}{x^{7n+1+2n^2}}$$

$$= x^{7n+5+2n^2-7n-1-2n^2}$$

$$= x^{5-1}$$

$$= x^4$$

Ques 13 Simplify $\div \frac{a^{7+2n} \cdot (a^2)^{3n+2}}{(a^4)^{2n+3}}$

$$= \frac{a^{7+2n} \times a^{2\times 3n+2\times 2}}{a^{4\times 2n+4\times 3}}$$

$$= \frac{a^{7+2n} \times a^{6n+4}}{a^{8n+12}}$$

$$= \frac{a^{7+2n+6n+4}}{a^{8n+12}}$$

$$= \frac{a^{11+8n}}{a^{8n+12}}$$

$$= a^{11+8n-8n-12}$$

$$= a^{-1} = \frac{1}{a}$$

Q4. Evaluate :-

i) $\left[\frac{16}{625}\right]^{1/4}$

$= \frac{16^{\frac{1}{4}}}{625^{\frac{1}{4}}}$

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

ii) $\left[\frac{81}{16}\right]^{-1/4}$

$= \left[\frac{16}{81}\right]^{\frac{1}{4}}$

$= \frac{16^{\frac{1}{4}}}{81^{\frac{1}{4}}}$

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

iii) $(64)^{2/3} + \sqrt[3]{125} + 3^0 + \frac{1}{2^{-5}} + (27)^{-2/3} + \left[\frac{25}{9}\right]^{-1/2}$

$2^{6\times\frac{2}{3}} + 5^{3\times\frac{1}{3}} + 1 + 1\times 2^5 + 3^{3\times-\frac{2}{3}} \times \frac{5^{2\times-\frac{1}{2}}}{3^{2\times-\frac{1}{2}}}$

$2^{2\times2} + 5^1 + 1 + 2^5 + 3^{-2} + \frac{5^{-1}}{3^{-1}}$

$2^4 + 5 + 1 + 2^5 + \frac{1}{3^2} + \frac{3^1}{5^1}$

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$16+5+1+32+\frac{1}{93}\times\frac{31}{5}$

$\frac{54}{1}+\frac{1}{15}$

$\frac{54\times15+1}{15}=\frac{810+1}{15}=\frac{811}{15}=54\frac{1}{15}$

iv) $(81)^{-1}\times3^{-5}\times3^{9}\times(64)^{5/6}+\sqrt[3]{3^5}\,(\sqrt[3]{3})^6$

$3^{4\times(-1)}\times3^{-5}\times3^{9}\times2^{6\times\frac{5}{6}}+3^{\frac{1}{81}\times162}$

$3^{-4}\times3^{-5}\times3^{9}\times2^{5}\times3^{2}$

$3^{-4+(-5)+9+2}\times2^{5}$

$3^{2}\times2^{5}$

$9\times32=288$

v) $\sqrt{\frac{y^3}{x}}\times\sqrt{\frac{y}{x}}$

$=\frac{y^{3\times\frac{1}{2}}}{x^{\frac{1}{2}}}\times\frac{y^{\frac{1}{2}}}{x^{\frac{1}{2}}}$

$=\frac{y^{\frac{3}{2}+\frac{1}{2}}}{x^{\frac{1}{2}+\frac{1}{2}}}$

$=\frac{y^{\frac{3+1}{2}}}{x^{\frac{1+1}{2}}}$

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$= \frac{y^{\frac{4}{2}}}{x^{\frac{3}{2}}}$

$= \frac{y^2}{x^1} = \frac{y^2}{x}$

Ques:5 Find the value of x when:

i) $\left[\frac{-3}{11}\right]^{x+5} \div \left[\frac{-3}{11}\right]^{-2x+3} = \left[\frac{-3}{11}\right]^{2x-5} \times \left[\frac{-3}{11}\right]^{-2x(x+4)}$

$\left[\frac{-3}{11}\right]^{x+5} \times \left[\frac{11}{-3}\right]^{-2x+3} = \left[\frac{-3}{11}\right]^{2x-5} \times \left[\frac{-3}{11}\right]^{-2x(x+4)}$

$= \left[\frac{-3}{11}\right]^{x+5} \times \left[\frac{-3}{11}\right]^{2x-3} = \left[\frac{-3}{11}\right]^{2x-5} \times \left[\frac{-3}{11}\right]^{-2x-8}$

$= \left[\frac{-3}{11}\right]^{x+5+2x-3} = \left[\frac{-3}{11}\right]^{2x-5-2x-8}$

$= \left[\frac{-3}{11}\right]^{3x+2} = \left[\frac{-3}{11}\right]^{-13}$

$= 3x - 12 = -13$

$3x = -13 - 2$

$3x = -15$

$x = \frac{-15}{3} 5 = -5$

ii) $\left[\left\{\left(\frac{2}{5}\right)^2\right\}^4\right]^{x+2} = \left[\left\{\left(\frac{2}{5}\right)^{-2}\right\}^{(x-1)}\right]^{-3}$

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$$\left(\frac{2}{5}\right)^{2\times4\times(x+2)} = \left(\frac{2}{5}\right)^{-2\times(x-1)\times-3}$$

$$\left(\frac{2}{5}\right)^{8\times(x+2)} = \left(\frac{2}{5}\right)^{6\times(x-1)}$$

$$\left(\frac{2}{5}\right)^{8\times x+8\times2} = \left(\frac{2}{5}\right)^{6\times x-6\times1}$$

$$= \left(\frac{2}{5}\right)^{8x+16} = \left(\frac{2}{5}\right)^{6x-6}$$

$$= 8x-6x = -6-16$$
$$= 2x = -22$$
$$x = \frac{-22}{2} \quad -11 = -11$$

Question Simplify:-

i) $[\xi 2p^{-1}q^{2}r3^{3}]^{-2}$

$(2p^{-1}q^{2}r)^{3x-2}$

$(2p^{-1}q^{2}r)^{-6}$

$2^{-6}\times p^{-1\times-6}\times q^{2\times-6}\times r^{-6}$

$2^{-6}\times p^{6}\times q^{-12}\times r^{-6}$

$$\frac{p^6}{2^6\times q^{12}\times r^6} = \frac{p^6}{64q^{12}r^6}$$

your writing partner

ii) $\left[\frac{3p^2 \cdot q r^{-2}}{2p^{-1} q^3}\right]^2 \div (2p^3 r)^{-1}$

$\left[\frac{3}{2} \times p^{2-(-1)} \times q^{1-3} \times r^{-2}\right]^2 \div \frac{1}{(2p^3 r)^1}$

$= \left[\frac{3}{2} \times p^{2+1} \times q^{-2} \times r^{-2}\right]^2 \times 2p^3 r$

$= \left[\frac{3}{2} p^3 \times \frac{1}{q^2} \times \frac{1}{r^2}\right]^2 \times 2p^3 r$

$= \frac{3^2 \times p^{3 \times 2}}{2^2} \times \frac{1}{q^{2 \times 2}} \times \frac{1}{r^{2 \times 2}} \times 2p^3 r$

$= \frac{9 \times p^6}{4} \times \frac{1}{q^4} \times \frac{1}{r^4} \times 2p^3 r$

$= \frac{9}{2} \times p^{6+3} \times \frac{1}{q^4} \times \frac{1}{r^4} \times \frac{1}{r^{-1}}$

$= \frac{9}{2} \times p^9 \times \frac{1}{q^4} + \frac{1}{r^{4+(-1)}}$

$= \frac{9}{2} \times p^9 \times \frac{1}{q^4} + \frac{1}{r^3}$

$= \frac{9 p^9}{2 q^4 r^3}$

DATE 23/04/2026

Assignment Test

Indicies

1) Show that:-

$$\frac{x^{m+n} \times x^{n+l} \times x^{l+m}}{(x^m \times x^n \times x^l)^2} = 1$$

$$= \frac{x^{2mn+2n+2l}}{x^{2m} \times x^{2n} \times x^{2l}} = 1$$

$$= x^{2m+2n+2l-2m-2n-2l} = 1$$

$$= x^0 = 1$$

2) Show that :-

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

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

$$= \left[\frac{x^{pn}}{x^{qn}}\right] \times \left[\frac{x^{qp}}{x^{np}}\right] \times \left[\frac{x^{nq}}{x^{pq}}\right] = 1$$

$$= \frac{x^{pn+qp+nq}}{x^{qn+np+pq}} = 1$$

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$x^{pr+qp+rq-2r-rp-pq}$

$x^0 = 1$

3.) Solve - $\sqrt[3]{x^{18} y^{-12} z^3}$

$= (x^{18} \times y^{-12} \times z^3)^{1/3}$

$= (x^{\frac{6}{18} \times \frac{1}{3}} \times y^{\frac{-4}{-12} \times \frac{1}{3}} \times z^{3 \times \frac{1}{3}})$

$= x^6 \times y^{-4} \times z^1$

$= \frac{x^6 z}{y^4}$

4.) Show that:- $\sqrt{x^{p-q}} \times (x^{q-r})^{1/2} \times (x^{r-p})^{1/2} = 1$

$= (x^{p-q})^{1/2} \times (x^{q-r})^{1/2} \times (x^{r-p})^{1/2} = 1$

$= \left(\frac{x^p}{x^q}\right)^{1/2} \times \left(\frac{x^q}{x^r}\right)^{1/2} \times \left(\frac{x^r}{x^p}\right)^{1/2} = 1$

$\frac{x^{\frac{1}{2}p}}{x^{\frac{1}{2}q}} \times \frac{x^{\frac{1}{2}q}}{x^{\frac{1}{2}r}} \times \frac{x^{\frac{1}{2}r}}{x^{\frac{1}{2}p}} = 1$

$= x^0 = 1$

5.) Simplify:- $\frac{x^{2n+3} \cdot x^{(2n+1)(2n+2)}}{(x^3)^{2n+1} \cdot x^{n(2n+1)}}$

$= \frac{x^{2n+3} \times x^{2n \times (n+2) + 1 \times (n+2)}}{x^{6n+1} \times x^{2n^2+1}}$

$$\frac{x^{2n+3} \times x^{2n^2+2n+n+2}}{x^{6n+1} \times x^{2n^2+n}}$$

$$= \frac{x^{2n+3} \times x^{2n^2+3n+2}}{x^{6n+1} \times x^{2n^2+n}}$$

$$= \frac{x^{2n+3+2n^2+3n+2}}{x^{6n+1+2n^2+n}}$$

$$= \frac{x^{2n^2+5n+5}}{x^{2n^2+7n+1}}$$

$$= x^{2n^2+5n+5-2n^2-7n-1}$$

$$= x^{5-1}$$

$$= x^4$$

6.) $\frac{1}{1+x^{a-b}} + \frac{1}{1+x^{b-a}}$ → Evaluate

$$= \frac{1}{\frac{1}{1} + \frac{x^a}{x^b}} + \frac{1}{\frac{1}{1} + \frac{x^b}{x^a}}$$

$$= \frac{1}{\frac{1 \times x^b + x^a \times 1}{x^b}} + \frac{1}{\frac{1 \times x^a + x^b \times 1}{x^a}}$$

$$= 1 \times \frac{x^b}{x^b + x^a} + 1 \times \frac{x^a}{x^a + x^b}$$

$$= \frac{x^b}{x^{a+b}} + \frac{x^a}{x^{a+b}}$$

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$$= \frac{x^b}{x^b + x^a} + \frac{x^a}{x^a + x^b}$$

$$= \frac{x^b + x^a}{x^a + x^b}$$

$$= 1$$

Ques-4 Show that :- $\sqrt{x^{p-q}} \times (x^{q-r})^{1/2} \times (x^{r-p})^{1/2} = 1$

$$= (x^{p-q})^{1/2} \times (x^{q-r})^{1/2} \times (x^{r-p})^{1/2} = 1$$

$$= \left(\frac{x^p}{x^q}\right)^{1/2} \times \left(\frac{x^q}{x^r}\right)^{1/2} \times \left(\frac{x^r}{x^p}\right)^{1/2} = 1$$

$$= \frac{x^{p \times \frac{1}{2}}}{x^{q \times \frac{1}{2}}} \times \frac{x^{q \times \frac{1}{2}}}{x^{r \times \frac{1}{2}}} \times \frac{x^{r \times \frac{1}{2}}}{x^{p \times \frac{1}{2}}}$$

$$= \frac{x^{\frac{1}{2}p + \frac{1}{2}q + \frac{1}{2}r}}{x^{\frac{1}{2}q + \frac{1}{2}r + \frac{1}{2}p}}$$

$$= x^{\frac{1}{2}p + \frac{1}{2}q + \frac{1}{2}r - \frac{1}{2}q - \frac{1}{2}r - \frac{1}{2}p}$$

$$= x^0 = 1$$

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Exercise 2-B

Multiple choice Questions :-

Ques-1 which of the following values are equal?

I) 1^5 (II) 5^0 (iii) 0^5 (iv) 5^1

I) $1^5 = 1\times1\times1\times1\times1 = 1$

II) $5^0 = $ ~~$5\times0 = 5$~~ 1

III) $0^5 = 0\times0\times0\times0\times0 = 0$

IV) $5^1 = 5\times1 = 5$

Ans) I and II are having same values.

Ques-2 If $5^x = 3125$, then the value of $5^{(x-3)}$ is

$5^x = 3125$, $5^{(x-3)}$

$5^x = 5^5$

$x = 5$

$5^{(x-3)} = 5^{(5-3)}$

$= 5^2 = 5\times5 = 25$

5	3125
5	625
5	125
5	25
5	5
	1

$3125 = 5\times5\times5\times5\times5$

5×5

Ques-3 The value of $(256)^{\frac{5}{4}}$ is

$2^8 = 256$

$(256)^{\frac{5}{4}} = 2^{8\times\frac{5}{4}} = 2^{2\times5} = 2^{10} = 1024$

2	256
2	128
2	64
2	32
2	16
2	8
2	4

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Ans-4 The value of $27^{-\frac{2}{3}}$ lies between

$27 = 3^3$

$(27)^{-\frac{2}{3}}$

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

3 | 27
3 | 9
3 | 3
1

$27 = 3\times3\times3$

$\frac{1}{9} = 0.111\ldots = 0.\overline{1}$

Ans-5 The value of $\left[\frac{32}{243}\right]^{-\frac{4}{5}}$ is

2 | 32
2 | 16
2 | 8
2 | 4
2 | 2
1

3 | 243
3 | 81
3 | 27
3 | 9
3 | 3
1

$= \left[\frac{2^5}{3^5}\right]^{-\frac{4}{5}}$

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

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

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

$= \frac{3^4}{2^4} = \frac{81}{16}$

Ans-6 The value of $[2-3(2-3)^{-1}]^{-1}$ is

$[2-3(2-3)^{-1}]^{-1}$

$[2-3(-1)^{-1}]^{-1}$

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

$$= \left[\frac{2 - 3 \times \frac{1}{-1}}{}\right]^{-1}$$

$$= \left[\frac{2 - 3 \times -1}{1}\right]^{-1}$$

$$= (2+3)^{-1}$$

$$= 5^{-1} = \frac{1}{5}$$

Ques-7 The value of $(8^{-1} - 9^{-1})^{-1} \div (4^{-1} - 9^{-1})^{-1}$ is

$$(8^{-1} - 9^{-1})^{-1} \div (4^{-1} - 9^{-1})^{-1}$$

$$\left(\frac{1}{8} - \frac{1}{9}\right)^{-1} \div \left[\frac{1}{4} - \frac{1}{9}\right]^{-1}$$

$$\left(\frac{1\times9 - 1\times8}{72}\right)^{-1} \div \left(\frac{1\times9 - 1\times4}{36}\right)^{-1}$$

$$\left(\frac{9-8}{72}\right)^{-1} \div \left[\frac{9-4}{36}\right]^{-1}$$

$$\left(\frac{1}{72}\right)^{-1} \div \left(\frac{5}{36}\right)^{-1}$$

$$\frac{72}{1} \div \frac{36}{5}$$

2	8, 9
2	4, 9
2	2, 9
3	1, 9
3	1, 3
	1, 1

LCM = 72

$$64^{\frac{2}{3}} \times \frac{1}{16}$$

$$= 4^{\frac{2}{3}}$$

Ans 3 $(64)^{-\frac{2}{3}} - (-32)^{-\frac{3}{5}} = ?$

$64 = 2^6$

$32 = 2^5$

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

$= 2^{6 \times -\frac{2}{3}} - (-2)^{5 \times -\frac{3}{5}}$

$= 2^{-4} - (-2)^{-3}$

$= \frac{1}{2^4} + \frac{1}{(-2)^3}$

$= \frac{1}{16} - \frac{1}{8} = \frac{1 \times 2 - 1 \times 1}{16} = \frac{2-1}{16} = \frac{1}{16}$

Ans Which of the following is the same as $\left[\frac{-5}{7}\right]^{-2}$?

a) $\left[\frac{5}{7}\right]^{-2}$ (b) $\left[\frac{5}{7}\right]^{-7}$ (c) $\left(\frac{7}{5}\right)^{2}$ d) $\left[\frac{-7}{5}\right]^{2}$

~~a) $\left[\frac{5}{7}\right]^{-2}$ = 9to25~~ $\left[\frac{-7}{5}\right]^{2}$

Ans If $3^{x+2} = 81$ and $81^{x-2} = 3^{8}$, then the value of x and y are respectively

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i) $3^{x+y} = 81$

$3^{x+y} = 3^4$

$x + y = 4$

$x = 4 - y$ ①

$81^{x-y} = 3^8$

$(3^4)^{x-y} = 3^8$

$3^{4\times(x-y)} = 3^8$

$3^{4x-4y} = 3^8$

$4x - 4y = 8$

$4(4-y) - 4y = 8$

$16 - 4y - 4y = 8$

$-8y = 8 - 16$

$-8y = -8 \Rightarrow y = \frac{+8}{+8} = 1$

$x = 4 - y$

$x = 4 - 1$

$x = 3$

Ans = 3, 1

Ques-11 Out of the following, which one is the greatest?

(a) $(0.008)^{\frac{1}{3}}$ b) $(0.01)^{\frac{1}{2}}$ c) $(0.2)^2$ d) $\frac{1}{100}$

Ans-11(a) $(0.008)^{\frac{1}{3}} = \left(\frac{8}{1000}\right)^{\frac{1}{3}} = \left(\frac{2^3}{10^3}\right)^{\frac{1}{3}}$

$= \frac{2^{3\times\frac{1}{3}}}{10^{3\times\frac{1}{3}}} = \frac{2}{10} = 0.2 = 0.20$

b) $(0.01)^{\frac{1}{2}} = \left(\frac{1}{100}\right)^{\frac{1}{2}} = \frac{1^{1\times\frac{1}{2}}}{10^{2\times\frac{1}{2}}} = \frac{1}{10} = 0.1 = 0.10$

c) $(0.2)^2 = 0.2 \times 0.2 = 0.04$

d) $\frac{1}{100} = 0.01$

$0.20 > 0.10 > 0.04 > 0.01$

$0.20 = (0.008)^{\frac{1}{3}}$ is greatest.

Ques-12 $(1000)^{12} \div (10)^{30} = ?$

$(10^3)^{12} \div (10)^3$

$= 10^{3\times12} \div 10^{30}$

$= 10^{36} \div 10^{30}$

$= 10^{36-30}$

$= 10^6 = 10^{3\times2} = (10^3)^2 = (1000)^2$

Ques13 If $(0.04)^2 \div (0.008) \times (0.2)^6 = (0.2)^x$, then the value of x is

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$(0.04)^2 \div (0.008) \times (0.2)^6 = (0.2)^x$

$\left(\frac{0.04}{100}\right)^2 \div \left(\frac{0.008}{1000}\right) \times \left(\frac{0.2}{10}\right)^6 = \left(\frac{0.2}{10}\right)^x$

$\left(\frac{2^2}{10^2}\right)^2 \div \left(\frac{2^3}{10^3}\right) \times \left(\frac{2^6}{10^6}\right) = \left(\frac{2}{10}\right)^x$

$\frac{2^4}{10^4} \div \frac{2^3}{10^3} \times \frac{2^6}{10^6} = \left(\frac{2}{10}\right)^x$

$\frac{2^{4-3}}{10^{4-3}} \times \frac{2^6}{10^6} = \left(\frac{2}{10}\right)^x$

$\frac{2^1}{10^1} \times \frac{2^6}{10^6} = \left(\frac{2}{10}\right)^x$

$\frac{2^{1+6}}{10^{1+6}} = \left(\frac{2}{10}\right)^x$

$\left(\frac{2}{10}\right)^7 = \left(\frac{2}{10}\right)^x$

$7 = x$

Ques-14 If $(25)^{2.5} \times (5)^{2.5} \div (125) = 5^x$, then the value of x is

$(25)^{2.5} \times (5)^{2.5} \div (125) = 5^x$

$(5^2)^{2.5} \times (5)^{2.5} \div (5^3)^{1.5} = 5^x$

$5^{2 \times 2.5} \times 5^{2.5} \div 5^{3 \times 1.5} = 5^x$

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$5^{18} \times 5^{2x} = 5^{4x} \cdot 5^{x}$

$5^{18} \times 5^{2x} \cdot 5^{x}$

$5^{18+(2x+x)} \cdot 5^{x}$

$5^{18+3x} \cdot 5^{x}$

$5^{18} \cdot 5^{x}$

$18 = x$

Item 15 If $2^{x+1} = 8^{x}$, then x has the value

$2^{x+1} = 8^{x}$

$2^{x+1} = (2^{3})^{x}$

$2^{x+1} = 2^{3x}$

$x+1 = 3x$

$1 = 3x - x$

$1 = 2x$

$\frac{1}{2} = x$

Item 16 Given that $3^{n} + 3^{n} + 3^{n} = 3^{2013}$, what is the value of n?

$3^{n} + 3^{n} + 3^{n} = 3^{2013}$

$3 \times 9^n = 3^{2013}$

$3 \times (3^2)^n = 3^{2013}$

$3^1 \times 3^{2n} = 3^{2013}$

$3^{1+2n} = 3^{2013}$

$1+2n = 2013$

$2n = 2013 - 1$

$2n = 2012$

$n = \frac{2012}{2}$ 1006

$n = 1006$

If $3^{x-1} + 3^{x+1} = 90$, then x is equal to

$\frac{3^x}{3^1} + 3 \rightarrow 3^x \times 3^1 = 90$

$3^x \left[\frac{1}{3} + 3\right] = 90$

$3^x \left[\frac{1+3\times3}{3}\right] = 90$

$3^x \cdot \left[\frac{10}{3}\right] = 90$

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$3^x = 90 \times \frac{3}{10}$

$3^x = 27$

$3^x = 3^3 = x = 3$

Ques-18 If $\left(\frac{x}{y}\right)^{n-1} = \left(\frac{y}{x}\right)^{n-3}$, then the value of n is

$\left(\frac{x}{y}\right)^{n-1} = \left(\frac{y}{x}\right)^{n-3}$

$\left[\frac{x}{y}\right]^{n-1} = \left[\left(\frac{x}{y}\right)^{-1}\right]^{n-3}$

$\left(\frac{x}{y}\right)^{n-1} = \left(\frac{x}{y}\right)^{-1(n-3)}$

$\left(\frac{x}{y}\right)^{n-1} = \left(\frac{x}{y}\right)^{(-n+3)}$

$n-1 = -n+3$

$n+n = 3+1$

$2n = 4$

$n = \frac{4}{2} = n = 2$

Ques-19 If $(25)^x = (125)^y$, then x : y equals

$(25)^x = (125)^y$

$(5^2)^x = (5^3)^y$

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$5^{2x} = 5^{3y}$

$2x = 3y$

$\frac{x}{y} = \frac{2}{3}$

$x : y = 2 : 3$

The simplified value of $\frac{2 \cdot 3^{n+1} + 7 \cdot 3^{n-1}}{3^{n+2} - 2\left[\frac{1}{3}\right]^{1-n}}$ is

$\frac{2 \times 3^n \times 3^1 + 7 \times 3^n \times 3^{-1}}{3^n \times 3^2 - 2\,(3)^{-1 \cdot (1-n)}}$

$\frac{6 \times 3^n + \frac{7 \times 3^n}{3}}{3^n \times 9 - 2 \times (3)^{-1} \times (1-n)}$

$\frac{3^n \left(\frac{6}{1} + \frac{7}{3}\right)}{3^n \times 9 - 2 \times (3)^{-1+n}}$

$\frac{3^n \left(\frac{6 \times 3 + 7}{3}\right)}{3^n \times 9 - 2 \times 3^{-1} \times 3^n}$

$\frac{3^n \left(\frac{18+7}{3}\right)}{3^n \times 9 - \frac{2 \times 3^n}{3}}$

$$\frac{2^{n}\left(\frac{25}{3}\right)}{2^{n}\left(\frac{9}{1}-\frac{2}{3}\right)}$$

$$\frac{25}{\left(\frac{9\times3-2}{3}\right)}$$

$$\frac{\left(\frac{25}{3}\right)}{\left(\frac{27-2}{3}\right)} = \frac{\left(\frac{25}{3}\right)}{\left(\frac{25}{3}\right)}$$

$$= \frac{\cancel{25}}{\cancel{3}} \times \frac{\cancel{3}}{\cancel{25}} = 1$$

Mental Maths

1.) Fill in the blanks-

i) The value of $(-5)^{-3}$ is _____

$$\frac{1}{(-5)^{3}}$$

$$= \frac{1}{(-5)\times(-5)\times(-5)}$$

$$= \frac{1}{-125} = -\frac{1}{125}$$

ii) $\frac{1}{512}$ expressed as a power with base 8 is ___

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$\frac{1}{8\times8\times8} = \frac{1}{8^3} = 8^{-3}$

8	512
8	64
8	8
	1

$(8)^3$

The value of $\left(\frac{1}{2}\right)^{-2} + \left(\frac{1}{3}\right)^{-2} + \left(\frac{1}{4}\right)^{-2}$ is

$\left[\frac{1}{2}\right]^{-2} + \left[\frac{1}{3}\right]^{-2} + \left[\frac{1}{4}\right]^{-2}$

$\left[\frac{2}{1}\right]^{2} + \left[\frac{3}{1}\right]^{2} + \left[\frac{4}{1}\right]^{2}$

$\frac{4}{1} + \frac{9}{1} + \frac{16}{1}$

$\frac{4+9+16}{1} = \frac{29}{1} = 29$

$(-3)^4 \div 3^4$ is equal to 1

$81 \div 81 = 1$

If $3 \cdot 3^n = 3$, then the value of n is 0.

$3 \cdot 3^n = 3$

$3 \times 3^n = 3$

$3^n = \frac{3}{3}$

$3^n = 1 \Rightarrow 3^n = 3^0$

$n = 0$

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The multiplicative inverse of 10^{10} is 10^{-10}

$10^{10} = \frac{1}{10^{10}} = 10^{-10}$

~~$5^0 + 6^0$~~ $(5^0 + 6^0 + 7^0) = 3$

$1 + 1 + 1 = 3$

write true (T) or false (F) :-

$a^m \times b^n = (ab)^{mn}$

False

$(10)^{-100} = (100)^{-10}$

$(10)^{-100} = (100)^{-10}$

$(100)^{-10} = (10^2)^{-10}$

$= 10^{2 \times -10}$

$= (10)^{-20}$

$(10)^{-20} \neq (10)^{-100}$

Hence, the statement is false.

The reciprocal of $\left[\frac{3}{7}\right]^{-2}$ is $\left[\frac{7}{3}\right]^2$

$\left[\frac{3}{7}\right]^{-2}$ is $\left[\frac{7}{3}\right]^2$

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Reciprocal of $\left(\frac{3}{7}\right)^{-2} = \left[\frac{7}{3}\right]^{-2}$

$\left[\frac{7}{3}\right]^{-2} \neq \left[\frac{7}{3}\right]^{2}$

Hence, the statement is false.

) $(-a)^{-m} = \frac{1}{a^m}$

$(-a)^{-m} = \frac{1}{a^m}$

$\frac{1}{a^m} = a^{-m}$

$(-a)^{-m} \neq a^{-m}$

Hence the given statement is false.

v.) $10^5 \times 10^5 = 10^{10}$

$10^5 \times 10^5 = 10^{10}$

$10^{5+5} = 10^{10}$

$10^{10} = 10^{10}$

Hence, the given statement is true.

vi.) $p^{-\frac{2}{5}} \times p^{\frac{2}{5}} = 1$

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$p^{-\frac{2}{5}} \times p^{\frac{2}{5}} = 1$

$p^{-\frac{2}{5}+\frac{2}{5}}$

$p^0 = 1$

Hence, the given statement is true.

vi) $(-8)^{-3} \times (-8)^{-4} = (-8)^{-12}$

$(-8)^{-3+(-4)} = (-8)^{-7}$

$(-8)^{-7} \neq (-8)^{-12}$

Hence, the given statement is false.

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16/4/2020

Assignment

Maths Problems:-

1) In 2^n, n is known as

1) ~~Base~~ Variable

2) For a fixed base, if the exponent decreases by 1, the number becomes

2) one tenth of a previous numbes

3) 3^{-2} can be written as

$$\frac{1}{3^2}$$

4) The value of $\frac{1}{4^{-2}}$ is

$$\frac{1}{4 \times 4} = \frac{1}{16} = 16$$

5) The value of $3^5 \div 3^{-6}$ is

$3^5 - 3^{-6}$

$3^{5-(-6)}$

3^{5+6}

3^{11}

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6.) The value of $\left[\frac{2}{5}\right]^{-2}$ is

$\frac{5\times5}{2\times2} = \frac{25}{4}$

7.) The reciprocal of $\left[\frac{2}{5}\right]^{-2}$ is

$\frac{5}{2}$

8.) The multiplicative inverse of 10^{-100} is

8) 10^{100}

9.) The value of $(-2)^{2\times3-1}$ is

$(-2)^{2\times3-1}$

$(-2)^{6-1}$

$(-2)^{5}$

$-2\times(-2)\times(-2)\times(-2\times-2)$

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10.) The value of $\left[-\frac{2}{3}\right]^{4}$ is equal to

$\frac{2\times2\times2\times2}{3\times3\times3\times3} = \frac{-16}{-81} = \frac{81}{16}$

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11.) The multiplicative inverse of $\left[\frac{-5}{9}\right]^{99}$ is

11.) $\left[\frac{9}{5}\right]^{99}$

12.) If x by any non-zero and m, n be negative integers then $x^m \times x^n$ is equal to

12.) x^{m-n}

Q-13) If x be any integer different from zero and m be any ~~integer~~ positive integer, then x^m is equal to

13. $\frac{1}{x^m}$

14.) If x be any integer different from zero and m, n be any integer then $(x^m)^n$ is equal to

14.) x^{mn}

15.) which of the following is equal to $\left[\frac{-3}{4}\right]^{-3}$

15.) $-\left[\frac{3}{4}\right]^{-3}$

6.) $\left[\frac{-5}{7}\right]^{-5}$ is equal to :-

$= \left[\frac{-5}{-7}\right]^{-5}$

$= \frac{-3125}{-16807}$

$= \frac{16807}{3125}$

17.) $\left[\frac{-7}{5}\right]^{-1}$ is equal to

$\frac{7}{-5}$

18.) $(-9)^3 \div (-9)^8$ is equal to

18.) $(-9)^{-5}$

19.) For a non zero integer x, $x^7 \div x^{12}$ is equal to

19.) x^{-5}

20.) For a non zero integer x, $(x^4)^{-3}$ is equal to

20.) x^{-12}

21.) The value of $(7^{-1} - 8^{-1})^{-1} - (3^{-1} 4^{-1})^{-1}$ is -

21.) $\left(\frac{1}{7} - \frac{1}{8}\right)^{-1} - \left[\frac{1}{3} - \frac{1}{4}\right]^{-1}$

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$= \left(\frac{8-1}{56}\right)^{-1} - \left[\frac{4-3}{12}\right]^{-1}$

$= \left[\frac{1}{56}\right]^{-1} - \left[\frac{1}{12}\right]^{-1}$

$= 56 - 12$

$= 44$

22.) The standard form of 0.000064 is

22.) 64×10^{4}

23.) The standard form for 234_{000000} is

23.) 0.234×10^{3}