Watch Video Explanation of these notes on our website: www.LastHopeStudy.Com

Mathematics-9
Review Exercise
Download All Subjects Notes from website www.lasthopestudy.com

Q.1 Multiple choice questions. Choose the correct answer.

(i) $\left(27x^{-1}\right)^{-\frac{2}{3}}$ ________ **(U.B)**

(a) $\frac{\sqrt[3]{x^2}}{9}$ **(b)** $\frac{\sqrt{x^3}}{9}$

(c) $\frac{\sqrt[3]{x^2}}{8}$ **(d)** $\frac{\sqrt{x^3}}{8}$

(ii) Write $\sqrt[7]{x}$ in the exponential form ________ **(U.B)**

(a) x **(b)** x^7

(c) $x^{\frac{1}{7}}$ **(d)** $x^{\frac{7}{2}}$

(iii) Write $4^{\frac{2}{3}}$ with radical sing ________ **(U.B)**

(a) $\sqrt[3]{4^2}$ **(b)** $\sqrt[2]{4^3}$

(c) $\sqrt[2]{4^3}$ **(d)** $\sqrt{4^6}$

(iv) In $\sqrt[3]{35}$ the radicand is; **(K.B)**

(a) 3 **(b)** $\frac{1}{3}$

(c) 35 **(d)** None

(v) $\left(\frac{25}{16}\right)^{-\frac{1}{2}} =$ ________ **(K.B)**

(a) $\frac{5}{4}$ **(b)** $\frac{4}{5}$

(c) $-\frac{5}{4}$ **(d)** $-\frac{4}{5}$

(vi) The conjugate of $5+4i$ is ________ **(K.B)**

(a) $-5+4i$ **(b)** $-5-4i$

(c) $5-4i$ **(d)** $5+4i$

(vii) The value of i^9 is; **(U.B)**

(a) 1 **(b)** -1

(c) i **(d)** $-i$

(viii) Every real number is ________ **(K.B)**

(a) Positive integer **(b)** A rational number

(c) A negative integer **(d)** A complex number

(ix) Real point of $2ab\left(i+i^2\right)$ is ________ **(A.B)**

(a) $2ab$ **(b)** $-2ab$

Watch Video Explanation of these notes on our website: www.LastHopeStudy.Com

(c) $2abi$ (d) $-2abi$

(x) **Imaginary part of $-i(3i+2)$ is ________** **(A.B)**

(a) -2 (b) 2
(c) 3 (d) -3

(xi) **Which of the following sets have the closure property w.r.t addition?** **(K.B)**

(a) $\{0\}$ (b) $\{0,1\}$

(c) $\{0,1\}$ (d) $\left\{1, \sqrt{2}, \frac{1}{2}\right\}$

(xii) **Name the property of real number used in $\left[-\frac{\sqrt{5}}{2}\right] \times 1 = -\frac{\sqrt{5}}{2}$ ________** **(K.B)**

(a) Additive identity (b) Additive inverse
(c) Multiplicative identity (d) Multiplicative inverse

(xiii) **If $x, y, z \in R, z < 0$, then $x < y \Rightarrow ...$** **(K.B)**

(a) $xz < yz$ (b) $xz > yz$

(c) $xz = yz$ (d) None of these

(xiv) **IF $a, b \in \in R$, only one of $a = b$ or $a < b$ or $a > b$ hold is called ________** **(K.B)**

(a) Trichotomy property (b) Transitive property
(c) Additive property (d) Multiplicative property

(xv) **A non-terminating, non-recurring decimal represents …** **(K.B)**

(a) A natural number (b) A rational number

(c) An irrational number (d) A prime number

ANSWER KEY

i	a	vi	c	xi	a
ii	c	vii	c	xii	c
iii	a	viii	d	xiii	b
iv	c	ix	b	xiv	a
v	b	x	a	xv	c

Q.2 True or False? Identity

(i)	**Division is not an associative operation.**	True	**(K.B)**
(ii)	**Every whale number is a natural number.**	False	**(K.B)**
(iii)	**Multiplicative inverse of 0.02 is 50.**	True	**(K.B)**
(iv)	**π is rational number.**	False	**(K.B)**
(v)	**Every integer is a rational number.**	True	**(K.B)**
(vi)	**Subtraction is a commutative operation.**	False	**(K.B)**
(vii)	**Every real number is a rational number.**	False	**(K.B)**

Watch Video Explanation of these notes on our website: www.LastHopeStudy.Com

(viii) **Decimal representation of a rational number is either terminating or recurring.** **True** **(K.B)**

(ix) $1.\bar{8} = 1 + \frac{8}{9}$ **True** **(K.B)**

Q.3 Simplify the following

(i) $\sqrt[4]{81y^{-12}x^{-8}}$ **(A.B)**

Solution:

$$= \left(3^4 y^{12} x^{-8}\right)^{\frac{1}{4}}$$

$$= 3^{\cancel{4}\times\frac{1}{\cancel{4}}} y^{\cancel{-12}^{3}\times\frac{1}{\cancel{4}}} x^{\cancel{-8}^{2}\times\frac{1}{\cancel{4}}} \quad \because (ab)^n = a^n b^n$$

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

$$= \frac{3}{y^3x^2} \qquad \because a^{-n} = \frac{1}{a^n}$$

$$\Rightarrow \sqrt[4]{81y^{-12}x^{-8}} = \frac{3}{y^3x^2}$$

(ii) $\sqrt{25x^{10n}y^{8m}}$ **(A.B)**

Solution:

(BWP 2019, SWL 2015, D.G.K 2014, FSD 2021)

$$= \sqrt{25x^{10n}y^{8m}}$$

$$= \left(5^2 x^{10n} y^{8m}\right)^{\frac{1}{2}}$$

$$= 5^{2\times\frac{1}{2}}.x^{\cancel{10n}^{5}\times\frac{1}{\cancel{2}}}.y^{\cancel{8m}^{4}\times\frac{1}{\cancel{2}}} \quad \because (ab)^n = a^n b^n$$

$$= 5x^{5n}.y^{4m} \qquad \because \left(a^m\right)^n = a^{mn}$$

$$\Rightarrow \sqrt{25x^{10}y^{8m}} = 5x^{5n}.y^{4m}$$

Method II

$$\sqrt{25x^{10n}y^{8m}} = \sqrt{5^2\left(x^{5n}\right)^2\left(y^{4m}\right)^2}$$

$$= \sqrt{\left(5x^{5n}y^{4m}\right)^2} \quad \because (ab)^n = a^n b^n$$

$$= 5x^{5n}y^{4m} \qquad \because \sqrt[n]{a^n} = a$$

$$\Rightarrow \sqrt{25x^{10}y^{8m}} = 5x^{5n}.y^{4m}$$

(iii) $\left[\frac{x^3y^4z^5}{x^{-2}y^{-1}z^{-5}}\right]^{\frac{1}{5}}$ **(A.B)**

(BWP 2017, RWP 2014, MTN 2014, SGD 2018)

Solution:

$$= \left(x^{3+2}.y^{4+1}.z^{5+5}\right)^{\frac{1}{5}} \quad \because \frac{a^m}{a^n} = a^{m-n}$$

$$= \left(x^5y^5z^{10}\right)^{\frac{1}{5}}$$

$$= x^{\cancel{5}\times\frac{1}{\cancel{5}}} \times y^{\cancel{5}\times\frac{1}{\cancel{5}}} \times z^{\cancel{10}^{2}\times\frac{1}{\cancel{5}}} \quad \because (ab)^n = a^n b^n$$

$$= x.y.z^2$$

$$\Rightarrow \left[\frac{x^3y^4z^5}{x^{-2}y^{-1}z^{-5}}\right]^{\frac{1}{5}} = x.y.z^2$$

(iv) $\left(\frac{32x^{-6}y^{-4}z}{625x^4yz^{-4}}\right)^{\frac{2}{5}}$ **(A.B)**

Solution:

$$= \left(\frac{2^5x^{-4}y^{-4}z}{5^4x^4yz^{-4}}\right)^{\frac{2}{5}} \qquad \textbf{(Factorization)}$$

$$= \left[\frac{2^5z^{1+4}}{5^4x^{4+6}\times y^{1+4}}\right]^{\frac{2}{5}} \quad \because \frac{a^m}{a^n} = a^{m-n}$$

$$= \left[\frac{2^5z^5}{5^4x^{10}y^5}\right]^{\frac{2}{5}}$$

$$= \frac{2^{\cancel{5}\times\frac{2}{\cancel{5}}} \times z^{\cancel{5}\times\frac{2}{\cancel{5}}}}{5^{4\times\frac{2}{5}} \times x^{\cancel{10}^{2}\times\frac{2}{\cancel{5}}} \times y^{\cancel{5}\times\frac{2}{\cancel{5}}}} \quad \because \left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$= \frac{2^2 \times z^2}{5^{\frac{8}{5}} \times x^4 \times y^2} \qquad \because \left(a^m\right)^n = a^{mn}$$

$$= \frac{4z^2}{5^{\frac{5}{5}+\frac{3}{5}} \times x^4y^2}$$

$$= \frac{4z^2}{5^{1+\frac{3}{5}} \times x^4y^2}$$

$$= \frac{4z^2}{5\times 5^{\frac{3}{5}} x^4 y^2} \quad \because \frac{a^m}{a^n} = a^{m-n}$$

$$\Rightarrow \left(\frac{32x^{-6}y^{-4}z}{625x^4yz^{-4}}\right)^{\frac{2}{5}} = \frac{4z^2}{5\times 5^{\frac{3}{5}} x^4 y^2}$$

Q.4 Simplify $\sqrt{\frac{(216)^{\frac{2}{3}}\times(25)^{\frac{1}{2}}}{(0.04)^{-\frac{3}{2}}}}$ **(A.B)**

Solution: $\sqrt{\frac{(216)^{\frac{2}{3}}\times(25)^{\frac{1}{2}}}{(0.04)^{-\frac{3}{2}}}}$

$$= \sqrt{\frac{(6^3)^{\frac{2}{3}}\times(5^2)^{\frac{1}{2}}}{\left(\frac{4}{100}\right)^{-\frac{3}{2}}}} \quad \text{(factorization)}$$

$$= \sqrt{\frac{6^2\times 5}{\left(\frac{100}{4}\right)^{\frac{3}{2}}}} \quad \because a^{-n} = \left(\frac{1}{a}\right)^n$$

$$= \sqrt{\frac{6^2\times 5}{\left(\frac{2^2\times 5^2}{2^2}\right)^{\frac{3}{2}}}}$$

$$= \sqrt{\frac{6^2\times 5}{(5^2)^{\frac{3}{2}}}} \quad \because \frac{a^m}{a^m} = 1$$

$$= \sqrt{\frac{6^2\times 5}{(5)^3}} \quad \because (a^m)^n = a^{mn}$$

$$= \sqrt{\frac{6^2}{5^{3-1}}} \quad \because \frac{a^m}{a^n} = \frac{1}{a^{n-m}}$$

$$= \sqrt{\frac{6^2}{5^2}}$$

$$= \sqrt{\left(\frac{6}{5}\right)^2}$$

$$= \frac{6}{5} \quad \because \sqrt[n]{a^n} = a$$

Q.5 $\left(\frac{a^p}{a^q}\right)^{p+q} \times \left(\frac{a^q}{a^r}\right)^{q+r} \div 5\left(a^q \cdot a^r\right)^{p-r}$

(A.B)

Solution:

$$= \frac{\left(a^{p-q}\right)^{p+q}\left(a^{q-r}\right)^{q+r}}{5\left(a^{p+r}\right)^{p-r}} \quad \because \frac{a^m}{a^n} = a^{m-n}$$

$$= \frac{a^{(p-q)(p+q)}\times a^{(q-r)(q+r)}}{5a^{(p+r)(p-r)}} \quad \because (a^m)^n = a^{mn}$$

$$= \frac{a^{p^2-q^2}\times a^{q^2-r^2}}{5a^{p^2-r^2}} \quad \because (a+b)(a-b) = a^2 - b^2$$

$$= \frac{a^{p^2-q^2+q^2-r^2}}{5a^{p^2-r^2}} \quad \because a^m \times a^n = a^{m+n}$$

$$= \frac{a^{p^2-r^2-p^2+r^2}}{5} \quad \because \frac{a^m}{a^n} = a^{m-n}$$

$$= \frac{a^0}{5}$$

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

$$\Rightarrow \left(\frac{a^p}{a^q}\right)^{p+q} \times \left(\frac{a^q}{a^r}\right)^{q+r} \div 5\left(a^q \cdot a^r\right)^{p-r}$$

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

Q.6 Simplify: $\left(\frac{a^{2l}}{a^{l+m}}\right)\left(\frac{a^{2m}}{a^{m+n}}\right)\left(\frac{a^{2n}}{a^{n+l}}\right)$

(A.B)

Solution:

$$\left(\frac{a^{2l}}{a^{l+m}}\right)\left(\frac{a^{2m}}{a^{m+n}}\right)\left(\frac{a^{2n}}{a^{n+l}}\right)$$

$$= a^{2l-l-m}\times a^{2m-m-n}\times a^{2n-n-l} \quad \because \frac{a^m}{a^n} = a^{m-n}$$

$= a^{l-m} \times a^{m-n} \times a^{n-l}$

$= a^{l-m+m-n+n-l} \quad \because a^m \times a^n = a^{m+n}$

$= a^0$

$= 1$

$\Rightarrow \left(\frac{a^{2l}}{a^{l+m}}\right)\left(\frac{a^{2m}}{a^{m+n}}\right)\left(\frac{a^{2n}}{a^{n+2}}\right) = 1$

Q.7 Simplify $\sqrt[3]{\frac{a^l}{a^m}} \times \sqrt[3]{\frac{a^m}{a^n}} \times \sqrt[3]{\frac{a^n}{a^l}}$ **(A.B)**

Solution:

$= \sqrt[3]{a^{l-m}}\sqrt[3]{a^{m-n}}\sqrt[3]{a^{n-l}} \quad \because \frac{a^m}{a^n} = a^{m-n}$

$= \left(a^{l-m}\right)^{\frac{1}{3}} \times \left(a^{m-n}\right)^{\frac{1}{3}} \times \left(a^{n-l}\right)^{\frac{1}{3}} \quad \because \sqrt[n]{a} = a^{1/n}$

$= a^{\frac{l-m}{3}} \times a^{\frac{m-n}{3}} \times a^{\frac{n-l}{3}}$

$= a^{\frac{l-m}{3}+\frac{m-n}{3}+\frac{n-l}{3}} \quad \because a^m \times a^n = a^{m+n}$

$= a^{\frac{l-m+m-n+n-l}{3}}$

$= a^{\frac{0}{3}}$

$= a^0$

$= 1$

$\Rightarrow \sqrt[3]{\frac{a^l}{a^m}} \times \sqrt[3]{\frac{a^m}{a^n}} \times \sqrt[3]{\frac{a^n}{a^r}} = 1$

Method II

$\sqrt[3]{\frac{a^l}{a^m}} \times \sqrt[3]{\frac{a^m}{a^n}} \times \sqrt[3]{\frac{a^n}{a^l}}$

$= \sqrt[3]{\frac{a^l}{a^m} \times \frac{a^m}{a^n} \times \frac{a^n}{a^l}} \quad \because \sqrt[n]{a} \times \sqrt[n]{b} = \sqrt[n]{ab}$

$= \sqrt[3]{a^{l-m} \times a^{m-n} \times a^{n-l}} \quad \because \frac{a^m}{a^n} = a^{m-n}$

$= \sqrt[3]{a^{l-m+m-n+n-l}} \quad \because a^m \times a^n = a^{m+n} = \sqrt[3]{a^0}$

$=1 \quad \because a^0 = 1$