

OBJECTIVE

Q. Select the correct answer.

- $(27x^{-1})^{\frac{-2}{3}} = \underline{\hspace{2cm}}$
 (a) $\frac{\sqrt[3]{x^2}}{9}$ (b) $\frac{\sqrt{x^3}}{9}$
 (c) $\frac{\sqrt[3]{x^2}}{8}$ (d) $\frac{\sqrt{x^3}}{8}$
- Write $\sqrt[7]{x}$ in exponential form

 (a) x (b) x^7
 (c) $x^{\frac{1}{7}}$ (d) $x^{\frac{7}{x^2}}$
- Write $4^{\frac{2}{3}}$ with radical sign.....
 (a) $\sqrt[3]{4^2}$ (b) $\sqrt[4]{4^3}$
 (c) $\sqrt[2]{4^3}$ (d) $\sqrt[4]{4^6}$
- In $\sqrt[3]{35}$ the radicand is
 (a) 3 (b) $\frac{1}{3}$
 (c) 35 (d) None of these
- $\left(\frac{25}{16}\right)^{-\frac{1}{2}} = \underline{\hspace{2cm}}$
 (a) $\frac{5}{4}$ (b) $\frac{4}{5}$
 (c) $\frac{-5}{4}$ (d) $\frac{-4}{5}$
- The conjugate of $5 + 4i$ is ____
 (a) $-5 + 4i$ (b) $-5 - 4i$
 (c) $5 - 4i$ (d) $5 + 4i$
- The value of i^9 is ____
 (a) 1 (b) -1
 (c) i (d) $-i$

- Every real number is ____
 (a) A positive integer
 (b) A rational number
 (c) A negative integer
 (d) A complex number
- Real part of $2ab(i + i^2)$ is ____
 (a) $2ab$ (b) $-2ab$
 (c) $2abi$ (d) $-2abi$
- Imaginary part of $-i(3i + 2)$ is ____
 (a) -2 (b) 2
 (c) 3 (d) -3
- Which of the following sets have the closure property w.r.t. addition

 (a) $\{0\}$ (b) $\{0, -1\}$
 (c) $\{0, 1\}$ (d) $\left\{1, \sqrt{2}, \frac{1}{2}\right\}$
- Name the property of real numbers used in $\left(\frac{-\sqrt{5}}{2}\right) \times 1 = \frac{-\sqrt{5}}{2} \times 1$
 (a) Additive identity
 (b) Additive Inverse
 (c) Multiplicative identity
 (d) Multiplicative Inverse
- If $z < 0$ then $x < y \Rightarrow$
 (a) $xz < yz$ (b) $xz > yz$
 (c) $xz = yz$ (d) none of these
- If $a, b \in \mathbb{R}$ then only one of $a = b$ or $a < b$ or $a > b$ holds is called...
 (a) Trichotomy property
 (b) Transitive property
 (c) Additive property
 (d) Multiplicative property

15. A non-terminating, non-recurring decimal represents:
- A natural number
 - A rational number
 - An irrational number
 - A prime number
16. The union of the set of rational numbers and irrational numbers is known as set of ____
- Rational number
 - Irrational
 - Real number
 - Whole number
17. For each prime number A , \sqrt{A} is an ____
- Irrational
 - Rational
 - Real
 - Whole
18. Square roots of all positive non-square integers are ____
- Irrational
 - Rational
 - Real
 - Whole
19. π is an ____ number.
- Irrational
 - Rational
 - Real
 - None
20. $\forall a, b, c \in \mathbb{R}$ then $a < b$ and $b < c \Rightarrow a < c$ is ____ property.
- Transitive
 - Trichotomy property
 - Additive property
 - Multiplicative property
21. Name the property of real numbers used in $x > y$ or $x = y$ or $x < y$.
- Trichotomy
 - Transitive
 - Additive
 - Multiplicative
22. Name the property of real numbers used in $\pi + (-\pi) = 0$.
- Additive inverse
 - Multiplicative inverse
 - Additive identity
 - Multiplicative identity
23. $\sqrt{3}, \sqrt{3}$ is a ____ number.
- Rational
 - Irrational
 - Real
 - None
24. $\sqrt[4]{ab} = \sqrt[4]{a} \sqrt[4]{b}$
- $\sqrt[4]{a} \sqrt[4]{b}$
 - $\sqrt{a} \sqrt{b}$
 - $\sqrt[4]{a} \sqrt{b}$
 - $\sqrt{a} \sqrt[4]{b}$
25. $\sqrt[5]{-8} = ______$
- $(-8)^{\frac{1}{5}}$
 - $(-8)^5$
 - (-8)
 - $(8)^5$
26. The value of i^{10} is:
- 1
 - 1
 - i
 - i
27. The solution set of $x^2 + 1 = 0$ is:
- $\{i, i\}$
 - $\{i, -i\}$
 - $\{-i, -i\}$
 - None
28. The conjugate of $2 + 3i$ is ____
- $2 - 3i$
 - $-2 - 3i$
 - $-2 + 3i$
 - $2 + 3i$
29. Real part of $(-1 + \sqrt{-2})^2$ is:
- 1
 - $-2\sqrt{2}$
 - i
 - $2\sqrt{2}$
30. Imaginary part of $(-1 + \sqrt{-2})^2$ is
- 1
 - $-2\sqrt{2}$
 - 1
 - $2\sqrt{2}$

31. Product of a complex number and its conjugate is always a non-negative___

- (a) Real (b) Irrational
(c) Rational (d) None

ANSWER KEY

1.	a	2.	c	3.	a	4.	c	5.	b
6.	c	7.	c	8.	d	9.	b	10.	a
11.	a	12.	c	13.	b	14.	a	15.	c
16.	c	17.	a	18.	a	19.	a	20.	a
21.	a	22.	a	23.	c	24.	a	25.	a
26.	a	27.	b	28.	a	29.	a	30.	b
31.	a								

REVIEW EXERCISE

3. Simplify: (i) $\sqrt[4]{81y^{-12}x^{-8}}$

$$\begin{aligned} &= (3^4 y^{-12} x^{-8})^{\frac{1}{4}} \\ &= (3^4)^{\frac{1}{4}} (y^{-12})^{\frac{1}{4}} (x^{-8})^{\frac{1}{4}} \\ &= 3y^{-3}x^{-2} \\ &= \frac{3}{x^2 y^3} \end{aligned}$$

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

$$\begin{aligned} &= (5^2 x^{10n} y^{8m})^{\frac{1}{2}} \\ &= (5^2)^{\frac{1}{2}} (x^{10n})^{\frac{1}{2}} (y^{8m})^{\frac{1}{2}} \\ &= 5x^{5n}y^{4m} \end{aligned}$$

(iii) $\left(\frac{x^3 y^4 z^5}{x^{-2} y^{-1} z^{-5}}\right)^{\frac{1}{5}}$

$$\begin{aligned} &= (x^{3+2} y^{4+1} z^{5+5})^{\frac{1}{5}} \\ &= (x^5 y^5 z^{10})^{\frac{1}{5}} \\ &= (x^5)^{\frac{1}{5}} (y^5)^{\frac{1}{5}} (z^{10})^{\frac{1}{5}} \\ &= xyz^2 \end{aligned}$$

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

$$= \left(\frac{2^5 x^{-6} y^{-4} z}{5^4 x^4 y z^{-4}}\right)^{\frac{2}{5}}$$

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

$$= \left(\frac{2^5 x^{-10} y^{-5} z^5}{5^4}\right)^{\frac{2}{5}}$$

$$= \frac{(2^5)^{\frac{2}{5}} (x^{-10})^{\frac{2}{5}} (y^{-5})^{\frac{2}{5}} (z^5)^{\frac{2}{5}}}{(5^4)^{\frac{2}{5}}}$$

$$= \frac{2^2 x^{-4} y^{-2} z^2}{5^{\frac{8}{5}}}$$

$$= \frac{4z^2}{x^4 y^2 5.5^5}$$

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

$$= \left[\frac{(2^3 \times 3^3)^{\frac{2}{3}} \times (5^2)^{\frac{1}{2}}}{\left(\frac{4}{100}\right)^{\frac{-3}{2}}} \right]^{\frac{1}{2}}$$

$$= \left[\frac{(2^3)^{\frac{2}{3}} \times (3^3)^{\frac{2}{3}} \times 5}{\left(\frac{100}{4}\right)^{\frac{3}{2}}} \right]^{\frac{1}{2}}$$

$$= \left[\frac{2^2 \times 3^2 \times 5}{(25)^{\frac{3}{2}}} \right]^{\frac{1}{2}} = \left[\frac{2^2 \times 3^2 \times 5}{(5^2)^2} \right]^{\frac{1}{2}}$$

$$\begin{aligned}
 &= \left[\frac{2^2 \times 3^2 \times 5}{5^3} \right]^{\frac{1}{2}} = \left[\frac{2^2 \times 3^2}{5^2} \right]^{\frac{1}{2}} \\
 &= \frac{(2^2)^{\frac{1}{2}} \times (3^2)^{\frac{1}{2}}}{(5^2)^{\frac{1}{2}}} = \frac{2 \times 3}{5} = \frac{6}{5}
 \end{aligned}$$

Q.5 Simplify:

$$\begin{aligned}
 &\left(\frac{a^p}{a^q} \right)^{p+q} \cdot \left(\frac{a^q}{a^r} \right)^{q+r} \div 5(a^p \cdot a^r)^{p-r} \\
 &= (a^{p-q})^{p+q} \cdot (a^{q-r})^{q+r} \div 5(a^{p+r})^{p-r} \\
 &= a^{p^2-q^2} \cdot a^{q^2-r^2} \div 5a^{p^2-r^2} \\
 &= \frac{a^{p^2-q^2} \cdot a^{q^2-r^2}}{5a^{p^2-r^2}} \\
 &= \frac{a^{p^2-q^2+q^2-r^2-p^2+r^2}}{5} \\
 &= \frac{a^0}{5} = \frac{1}{5}
 \end{aligned}$$

Q.6. Simplify:

$$\begin{aligned}
 &\left(\frac{a^{2l}}{a^{l+m}} \right) \left(\frac{a^{2m}}{a^{m+n}} \right) \left(\frac{a^{2n}}{a^{n+l}} \right) \\
 &= a^{2l-l-m} \times a^{2m-m-n} \times a^{2n-n-l} \\
 &= a^{l-m} \cdot a^{m-n} \cdot a^{n-l} \\
 &= a^{l-m+m-n+n-l} \\
 &= a^0 = 1
 \end{aligned}$$

Q.7 Simplify:

$$\begin{aligned}
 &\sqrt[3]{\frac{a^l}{a^m}} \times \sqrt[3]{\frac{a^m}{a^n}} \times \sqrt[3]{\frac{a^n}{a^l}} \\
 &= \left(\frac{a^l}{a^m} \right)^{\frac{1}{3}} \times \left(\frac{a^m}{a^n} \right)^{\frac{1}{3}} \times \left(\frac{a^n}{a^l} \right)^{\frac{1}{3}} \\
 &= \frac{a^{\frac{l}{3}}}{a^{\frac{m}{3}}} \times \frac{a^{\frac{m}{3}}}{a^{\frac{n}{3}}} \times \frac{a^{\frac{n}{3}}}{a^{\frac{l}{3}}} \\
 &= a^{\frac{l}{3}-\frac{m}{3}+\frac{m}{3}-\frac{n}{3}+\frac{n}{3}-\frac{l}{3}} \\
 &= a^0 = 1
 \end{aligned}$$