SHIKSHA CLASSES

Sub : Maths **ANSWER PAPER** **Total Marks : 30**

Class : IX **1: Number System**

Section A (Each 1 Marks)

Multiple choice Questions (MCQs)

Q.1 : The decimal expansion of $\sqrt{2}$ is.

Ans.: d) Non-teminating non-recurring.

Q.2 : Which of the following is an irrational number?

Ans.: a) $\sqrt{23}$

Q.3 : The value of $(125)^{-1/3}$ is :

Ans.: b) $\frac{1}{5}$

Q.4 : $(5+\sqrt{8})+(3-\sqrt{2})-(\sqrt{2}-6)$ when simplified gives :

Ans.: c) A positive and rational number

Q.5 : Find the value of $\sqrt[4]{64^{-2}}$

Ans.: a) $\frac{1}{8}$

Q6 : When $15\sqrt{15}$ is divided by $3\sqrt{3}$ find the quotient.

Ans.: c) $5\sqrt{5}$

Q7 : Which of the following numbers is an irrational number?

Ans.: c) $\sqrt{5}+3$

Q8 : Can we write 0 in the form of p/q?

Ans.: a) yes

Q9 : Three rational numbers between 3 and 4 are

Ans.: b) $\frac{13}{4}, \frac{14}{4}, \frac{15}{4}$

For question number 10 to 11 two statement are given one labeled Assertion and other labeled Reason select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below

Q.10 : Assertion: every integer is a rational number

Reason: every integer is expressed in the form of m/1 so it is rational number

Ans.: a.) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion

Q.11 : Assertion: 0.468 is a terminating decimal.

Reason: A decimal in which a digit or a set of digits is repeated periodically, is called a repeating, or a recurring decimal.

Ans.: a.) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion

Section B (Each 2 Marks)

Q.12 : Rationalize the denominator of

$$\frac{1}{\sqrt{7}-\sqrt{6}}$$

Ans : $\frac{1}{\sqrt{7}-\sqrt{6}} = \frac{1}{\sqrt{7}-\sqrt{6}} \times \frac{\sqrt{7}+\sqrt{6}}{\sqrt{7}+\sqrt{6}}$

$$= \frac{\sqrt{7}+\sqrt{6}}{\left(\sqrt{7}\right)^2 - \left(\sqrt{6}\right)^2}$$

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

$$= \frac{\sqrt{7}+\sqrt{6}}{7-6}$$

$$= \sqrt{7}+\sqrt{6}$$

Q.13 : Find the value of x.

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

Ans : Given : $\left(\frac{3}{4}\right)^3 \cdot \left(\frac{4}{3}\right)^{-7} = \left(\frac{3}{4}\right)^{2x}$

i.e. $\left(\frac{3}{4}\right)^{2x} = \left(\frac{3}{4}\right)^3 \left(\frac{4}{3}\right)^{-7}$

$$\Rightarrow \left(\frac{3}{4}\right)^{2x} = \left(\frac{3}{4}\right)^3 \left(\frac{3}{4}\right)^7 \left[\because \left(\frac{a}{b}\right)^{-m} = \left(\frac{b}{a}\right)^m\right]$$

$$\Rightarrow \left(\frac{3}{4}\right)^{2x} = \left(\frac{3}{4}\right)^{10} \qquad [\because a^m \times a^n = a^{m+n}]$$

comparing both sides

$[\because a^m = a^n$ then $m = n]$

$2x = 10$

$\Rightarrow x = 5.$

OR

: Show that $\frac{x^{a(b-c)}}{x^{b(a-c)}} \div \left(\frac{x^b}{x^a}\right)^c = 1$

Ans : LHS $= \frac{x^{a(b-c)}}{x^{b(a-c)}} \div \left(\frac{x^b}{x^a}\right)^c$

$$= \frac{x^{ab-ac}}{x^{ba-bc}} \times \left(\frac{x^a}{x^b}\right)^c$$

$$= \frac{x^{ab-ac}}{x^{ab-bc}} \times \frac{x^{ac}}{x^{bc}} \quad \left[\because \left(\frac{a^m}{b^i}\right)^n = \frac{a^{mn}}{b^{in}}\right.$$

$$= \frac{x^{ab-ac+ac}}{x^{ab-bc+bc}} \qquad [\because a^m.a^n = a^{m+n}$$

$$= \frac{x^{ab}}{x^{ab}} = 1.$$

SECTION C

Q.14 : Prove that : $\frac{1}{1+x^{a-b}} + \frac{1}{1+x^{b-a}} = 1$

Ans : LHS $= \frac{1}{1+x^{a-b}} + \frac{1}{1+x^{b-a}}$

$$= \frac{1}{1+\frac{x^a}{x^b}} + \frac{1}{1+\frac{x^b}{x^a}} \qquad [\because a^{m-n} = \frac{a^m}{a^n}]$$

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

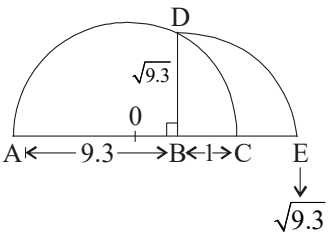
$$= \frac{x^b}{x^b+x^a} + \frac{x^a}{x^b+x^a}$$

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

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

Q.15 : Represent $\sqrt{9.3}$ on the number line.

Ans : To represent $\sqrt{9.3}$, draw a segment of 9.3 units on the number line, Let AB represent 9.3. Extend it by 1 unit.



Show that $\frac{10.3}{2} = 5.15$ by on the number line with '0' as centre and radius 5.15 units

draw a semicircle. Draw BD perpendicular to AB to cut semicircle at D. The length BE is $\sqrt{9.3}$ units.

Section : D (Each 3 marks)

Q.16 : Evaluate $\left(\frac{81}{16}\right)^{-3/4} \times \left[\left(\frac{9}{25}\right)^{3/2} \div \left(\frac{5}{2}\right)^{-3}\right]$

Ans : $\left(\frac{81}{16}\right)^{-3/4} \times \left[\left(\frac{9}{25}\right)^{3/2} \div \left(\frac{5}{2}\right)^{-3}\right]$

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

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

$\left[\because \left(\frac{a}{b}\right)^{-m} = \left(\frac{b}{a}\right)^{m} \left[\because \left(a^m\right)^n = a^m\right.\right.$

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

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

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

$= \frac{2\times 2\times 2\times 3\times 3\times 3\times 5\times 5\times 5}{3\times 3\times 3\times 5\times 5\times 5\times 2\times 2\times 2}$

$= 1$

OR

: Prove that $\frac{16\times 2^{n+1} - 4\times 2^n}{16\times 2^{n+2} - 2\times 2^{n+2}} = \frac{1}{2}$

Ans : $\text{LHS} = \frac{16\times 2^{n+1} - 4\times 2^n}{16\times 2^{n+2} - 2\times 2^{n+2}}$

$= \frac{16\times 2\times 2^n - 4\times 2^n}{2^{n+2}(16-2)} \quad \left[\because a^{m+n} = a^m.a^n\right]$

$= \frac{2^n(32-4)}{2^2\times 2^n(14)} = \frac{1}{4}\left(\frac{28}{14}\right)$

$= \frac{1}{4}\times 2 = \frac{1}{2} = \text{RHS.}$

Section : E

Q.17 : Case Study : (Any Four) 4

Two classmates salma and Anil simplified two different expression during the revision hour and explained to each other their simplifictions.

Salma explains simplification of $\frac{\sqrt{2}}{\sqrt{5}+\sqrt{3}}$ by rationalising the denominator and Anil explains simplification of by using the identity (a + b) (a – b)

Answer the following questions.

i) What is the conjugate of $\sqrt{5}+\sqrt{3}$ **?**

Ans : b) $\sqrt{5}-\sqrt{3}$

ii) By rationalising the denominator of $\frac{\sqrt{2}}{\sqrt{5}+\sqrt{3}}$ **salma got the answer**

Ans : b) $\frac{\sqrt{2}\left(\sqrt{5}-\sqrt{3}\right)}{2}$

iii) Anil applied .....identity to solve $\left(\sqrt{5}+\sqrt{7}\right)\left(\sqrt{5}-\sqrt{7}\right)$

Ans : b) (a + b) (a – b)

iv) $\left(\sqrt{2}+\sqrt{3}\right)\left(\sqrt{2}-\sqrt{3}\right) =$

Ans : a) – 1

v) Addition of two irrational numbers is equal to

Ans : b) Irrational

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