CLASS-IX
MATHEMATICS
HOLIDAY HOMEWORK
CHAPTER-01, NUMBER SYSTEM

Short answer type questions-I

Q 1. Express the following numbers in the form of $\frac{p}{q}$.

a) $0.3\overline{2}$ b) $0.12\overline{3}$ c) $0.003\overline{52}$

Q 2. Find the three rational numbers between - 2 and 5.

Q 3. Express the following numbers in the form of $\frac{p}{q}$.

a) $4.3\overline{2}$ b) $15.7\overline{12}$

Q 4. Evaluate each of the following:

a) $\left(\frac{2}{11}\right)^4 \times \left(\frac{11}{3}\right)^2 \times \left(\frac{3}{2}\right)^3$ b) $\left(\frac{1}{2}\right)^5 \times \left(\frac{-2}{3}\right)^4 \times \left(\frac{3}{5}\right)^{-1}$

Short answer type questions-II

Q 5. Find the value of x, if $5^{(x-3)} \times 3^{(2x-8)} = 225$.

Q 6. Assuming that x is a positive real number and a, b, c are rational numbers, show that:

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

Q 7. Find the value of $\frac{32^{0.2} + 81^{0.25}}{256^{0.5} - 121^{0.5}}$

Long answer type questions

Q 8. If $\frac{9^n \times 3^2 \times 3^n - 27^n}{3^{3m} \times 2^3} = \frac{1}{27}$, prove that m – n = 1.

Q 9. If both a and b are rational numbers, find the values of a and b in each of the following equalities:

a) $\frac{\sqrt{3}-1}{\sqrt{3}+1} = a + b\sqrt{3}$ b) $\frac{\sqrt{2}+\sqrt{3}}{3\sqrt{2}-2\sqrt{3}} = a - b\sqrt{6}$

Q 10. Simplify the following : $\frac{\sqrt{5}-2}{\sqrt{5}+2} - \frac{\sqrt{5}+2}{\sqrt{5}-2}$

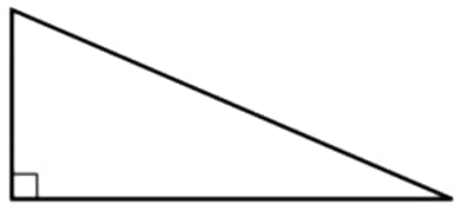
Q 11. If $x = 2 + \sqrt{3}$, find the value of (i) $x - \frac{1}{x}$ (ii) $x^2 + \frac{1}{x^2}$

Q 12. Find value of 'a' and 'b' if, $\frac{7+3\sqrt{5}}{3+\sqrt{5}} - \frac{7-3\sqrt{5}}{3-\sqrt{5}} = a + \sqrt{5}\,b$

Q 13. Solve : $\sqrt[4]{81} - 8\sqrt[3]{216} + 15\sqrt[5]{32} + \sqrt{225}$

Case Study Question

Q 14. Aarushi and Avni are playing with match-sticks by making different geometrical and other figures. Avni kept one match-stick horizontally and then two match-sticks vertically as shown in figure and then asks Aarushi to join the open ends of horizontally and vertically placed strings by a thread. Avni's elder sister Mira comes and ask them to find the length of the thread if each match-stick is of unit length.



Aarushi replies that the length of the thread can be found by using Pythagoras theorem and it is equal to $\sqrt{1^2 + 2^2} = \sqrt{4+1} = \sqrt{5}$ units.

Using your knowledge about numbers, answer the following questions:

(i) $\sqrt{5}$ is an …………………… number.

(ii) The decimal representation of an irrational number is ………………

(iii) The decimal representation of a rational number cannot be …………..

(iv) The sum of any two irrational numbers is………………

Art integrated project

1. Project - Constructing square root spiral.
2. Create a beautiful spiral depicting √2, √3, √4, √5, √6, √7, √8
3. Decorate its cover page using the beautiful arts of Bihar, for example, Manjusha, Tikuli and Madhubani.

Learn and write:

1. **Tables upto 25.**
2. **Squares of first 30 natural numbers.**
3. **Cubes of first 20 natural numbers.**