INDIAN SCHOOL NIZWA - WORKSHEET

MATHEMATICS

1. NUMBER SYSTEM

Name: _____ Date: 22-4-25 Class: IX Sec: ___

1. The decimal expansion of $\frac{1}{7}$ is:

   (a) Terminating (b) Non-terminating and non-repeating

   (c) Non-terminating and repeating (d) None of these

2. Every rational number can be expressed in the form p/q, where p and q are integers and:

   (a) q=0 (b) q≠0 (c) p=0 (d) p≠0

3. A rational number between 1/2 and 3/4 is:

   (a) 2/3 (b) 1/8 (c) 5/4 (d) 1/3

4. The value of $64^{1/2}$ is:

   (a) 4 (b) 8 (c) 16 (d) 32

5. The simplified form of $\sqrt{7} \times \sqrt{11}$ *is*

   (a) $\sqrt{18}$ (b) $\sqrt{77}$ (c) $7\sqrt{11}$ (d) $11\sqrt{7}$

6. Which of the following rational numbers has a non-terminating repeating decimal.

   (a) $\frac{16}{125}$ (b) $\frac{51}{150}$ (c) $\frac{23}{8}$ (d) $\frac{35}{14}$

7. The value of $\frac{(2^0+7^0)\times 5^0}{(2^0+7^0+5^0)}$ is

   (a) 1 (b) 2/3 (c) 2/12 d) 1/3

8. If $\sqrt[3]{x} = \frac{1}{2}$, then the value of x^{-2} is:

   (a) 64 (b) 16 (c) 1/16 (d) 1/4

9. Between any two distinct rational numbers, there are:

   (a) Only one rational number (b) Finitely many rational numbers

   (c) Infinitely many rational numbers (d) No rational numbers

10. Assertion and Reason:

    (a) Both Assertion and Reason are true and Reason is the correct explanation of the Assertion.

(b) Both Assertion and Reason are true and Reason is not the correct explanation of the Assertion.

(c) Assertion is true and Reason is false.

(d) Assertion is false and Reason is true.

11. Assertion (A): $(\sqrt{3}+\sqrt{2})(\sqrt{3}-\sqrt{2})$ is an irrational number.
Reason (R): The product of two irrational numbers is always irrational.

12. Assertion (A): $2^{\frac{1}{2}} \times 2^{\frac{1}{3}} = 2^{\frac{1}{6}}$.
Reason (R): $a^m \times a^n = a^{m \times n}$ for any non-zero real number a and rational numbers m *and* n.

13. Assertion (A): $\sqrt{0.4}$ is a rational number.
Reason (R): The square root of a decimal number is always a rational number.

14. Represent $\sqrt{6}$ on the same number line.

15. Insert two irrational numbers between $\frac{2}{3}$ and $\frac{3}{2}$

16. Find the value of x if $(\sqrt{3})^x = 3^7$.

17. If $2^{5x} \div 2^x = \sqrt[5]{32}$. Then find the value of x.

18. Ealuate : $a^{x-y}.a^{y-z}.a^{z-x}$

19. Which of the following rational numbers will have a terminating decimal or non-terminating repeating decimal expansion:
a) $\frac{135}{50}$ b) $\frac{4}{11}$ c) $\frac{55}{9}$ d) $6\frac{3}{8}$ e) $\frac{5^2 \times 3^3}{2 \times 5^3 \times 27}$

20. Classify the following numbers as terminating decimal or non-terminating recurring decimal or non-terminating non-recurring decimal
a) 0.16666……. b) 0.2359872785…… c) 1.010010001000001…….
d) 0.276967 e) 2.142857142857…….. e) $4.\overline{123456789}$
Also classify these given numbers as rational and irrational numbers.

21. Classify the following numbers as rational or irrational numbers:
a) $\sqrt{27}$ b) $\sqrt{36}$ c) $\sqrt{5} \times \sqrt{125}$ d) $2\sqrt{3}$ e) $\frac{7\sqrt{7}}{\sqrt{343}}$ f) $2+\sqrt{21}$
g) $5+\sqrt{23}-(\sqrt{25}+\sqrt{92})$

22. Express the following in the form of $\frac{p}{q}$, where p and q are integers and q$\neq$ 0.
a) 0.0875 b) 2.123456789 c) 0.181818….. d) 0.437 d) 3.651

23. If $a = 2+\sqrt{3}$, find the value of a$-\frac{1}{a}$.

24. Find the values of a and b : $\frac{7+\sqrt{5}}{7-\sqrt{5}} - \frac{7-\sqrt{5}}{7+\sqrt{5}} = a + \frac{7}{11}\sqrt{5}b.$

25. Simplify :

a) $(2\sqrt{2}+3\sqrt{3})(2\sqrt{2}-3\sqrt{3})$ b) $(2\sqrt{8}-3\sqrt{2})^2$ c) $(\sqrt{7}+\sqrt{6})^2$ d) $(6-\sqrt{2})(2+\sqrt{3})$

26. If $p = 5 - 2\sqrt{6}$, find the value of $\left(x - \frac{1}{x}\right)^3$.

27. Express **0.6+ 0.$\overline{7}$ + 0.$\overline{47}$** in the form of $\frac{p}{q}$.

28. Simplify: $\frac{25^{\frac{5}{2}} \times 729^{\frac{1}{2}}}{125^{\frac{2}{3}} \times 27^{\frac{2}{3}} \times 8^{\frac{4}{3}}}$

29. Evaluate: $\sqrt[4]{(81)^{-2}}$.

30. If $x = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ and y=$\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$, then find the value of $x^2 + xy - y^2$.

31. If $\sqrt{2} = 1.414$ *and* $\sqrt{3} = 1.732$, then find the value of $\frac{4}{3\sqrt{3}-2\sqrt{2}} + \frac{3}{3\sqrt{3}+2\sqrt{2}}$.

32. Simplify: $12\sqrt{18} - 6\sqrt{20} - 3\sqrt{50} + 8\sqrt{45}$.

33. Siimplify: $\sqrt[4]{\sqrt[3]{3^2}}$.

34. Find the value of x, if $2^{5x} \div 2^x = \sqrt[5]{2^{20}}$.

35. Simplify $\left(\frac{81}{16}\right)^{\frac{-3}{4}} \times \left[\left(\frac{25}{4}\right)^{\frac{-3}{2}} \div \left(\frac{5}{2}\right)^{-3}\right]$.

36. If x is a positive real number and the exponents are rational numbers, then simplify:

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

37. **Case study 1:** A group of students is designing a rectangular garden for their school. They have a length of $7 + 3\sqrt{5}$ metres and a width of $7 - 3\sqrt{5}$ metres for the garden.

Based on the above information, answer the following:

a) What is the area of the rectangular garden?

b) What is the perimeter of the rectangular garden?

c) Are the dimesions of the garden rational and irrational numbers?

d) If the students decide to fence the garden, what is the total length of fencing required?

38. **Case Study 2: The Rapidly Growing Bacteria Colony:**

A scientist is observing the growth of a bacteria colony in a petri dish. She notes that the number of bacteria doubles every hour. She starts her observation with an initial count of 500 bacteria.

Based on this scenario, answer the following questions:

i)How many bacteria will be present after 3 hours? Express your answer in exponential form?

a) $500x2^2$ b) $500x3^2$ c) $500x2^3$ d) 1000^3

ii) Calculate the actual number of bacteria present after 3 hours.

a) 2000 b) 4000 c) 8000 c) 16000

iii) How many bacteria will be present after n hours? Express your answer in terms of n.

a) $500x\ n^2$ b) 2^n c) $500x2^n$ d) 500+2n

iv) If the scientist wants to know how many hours it would take for the bacterial count to reach 32,000, which equation would she need to solve?

a) $500x\ 2^x=32000$ b) 500+2x=32000 c) $2^x=32000$ d) $500^x x2=32000$

v) Suppose, due to a change in environment, the bacteria now triple every hour instead of doubling. If the initial count is still 500, how many bacteria will be there after 2 hours?

a) $500x2^3$ b) $500x3^2$ c) $500+3^2$ d) 1500^2

39. <u>BASIC CONCEPTS</u>

Solve the following:

a)Convert the given fractions into decimals and arrange them in ascending order: 1/4, 1/7, 3/4, 6/2, 1/2.

b)Find the quotient if 4.036 is divided by 0.04.

c) Find the value of 29.94 ÷ 1.45, if 2994 ÷ 14.5 = 172.

d) Evaluate √6084

e) Simplify the expression: −2a(a + b) − 2a − (a + b)(−2a) − a − 2