DEVESH TEDIA CLASSES

Above muthoot finance bank, awadhpuri, bhopal

WORKSHEET

Class 09 - Mathematics

Time Allowed: 4 hours **Maximum Marks: 156**

Section A

1. The greater number among $\sqrt{17}-\sqrt{12}$ and $\sqrt{11}-\sqrt{6}$ is _____. **[1]**

   a) Both $\sqrt{17}-\sqrt{12}$ and $\sqrt{11}-\sqrt{6}$ are equal
   b) Can't be compared
   c) $\sqrt{11}-\sqrt{6}$
   d) $\sqrt{17}-\sqrt{12}$

2. If x = 7 + $4\sqrt{3}$ and xy = 1, then $\frac{1}{x^2}+\frac{1}{y^2}=$ **[1]**

   a) $\frac{1}{49}$
   b) 134
   c) 194
   d) 64

3. The simplest form of $0.3\overline{2}$ is **[1]**

   a) $\frac{19}{90}$
   b) $\frac{16}{45}$
   c) $\frac{32}{99}$
   d) $\frac{29}{90}$

4. The rational number not lying between $\frac{-1}{5}$ and $\frac{-2}{5}$ is **[1]**

   a) $\frac{-7}{25}$
   b) $\frac{-3}{10}$
   c) $\frac{-1}{4}$
   d) 0

5. The value of $0.\overline{2}$ in the form $\frac{p}{q}$ where p and q are integers and $q \neq 0$ is **[1]**

   a) $\frac{1}{8}$
   b) $\frac{1}{5}$
   c) $\frac{2}{9}$
   d) $\frac{2}{5}$

6. $\sqrt[5]{6}\times\sqrt[5]{6}$ is equal to **[1]**

   a) $\sqrt[5]{6\times 0}$
   b) $\sqrt[5]{12}$
   c) $\sqrt[5]{6}$
   d) $\sqrt[5]{36}$

7. If $\frac{5-\sqrt{3}}{2+\sqrt{3}}=x+y\sqrt{3}$, then **[1]**

   a) x = 13, y = 7
   b) x = -13, y = - 7
   c) x = -13, y = 7
   d) x = 13, y = -7

8. A rational number between -3 and 3 is **[1]**

   a) 0
   b) -4.3
   c) -3.4
   d) 1.101100110001 ...

9. If 9^{x+2} = 240 + 9^{x}, then the value of x is **[1]**

   a) 0.2
   b) 0.1

c) 0.3 d) 0.5

10. If $\sqrt{5^n}$ = 125, then $5^{\sqrt[n]{64}}$ = **[1]**

a) 25 b) 625

c) $\frac{1}{125}$ d) $\frac{1}{5}$

11. $8\sqrt{15} \div 2\sqrt{3}$ **[1]**

a) $4\sqrt{5}$ b) $2\sqrt{15}$

c) $4\sqrt{15}$ d) $2\sqrt{5}$

12. Which one of the following is not equal to $\left(\frac{100}{9}\right)^{\frac{-3}{2}}$ **[1]**

a) $\frac{3}{10} \times \frac{3}{10} \times \frac{3}{10}$ b) $\left(\frac{9}{100}\right)^{\frac{3}{2}}$

c) $\frac{1}{\left(\frac{100}{9}\right)^{\frac{-3}{2}}}$ d) $\sqrt{\frac{100}{9} \times \frac{100}{9} \times \frac{100}{9}}$

13. The value of $\frac{2}{\sqrt{5}-\sqrt{3}}$ is **[1]**

a) $\sqrt{5}+\sqrt{3}$ b) $\frac{1}{\sqrt{5}-\sqrt{3}}$

c) $\sqrt{5}-\sqrt{3}$ d) $\frac{1}{\sqrt{5}+\sqrt{3}}$

14. The value of $x^{p-q}\, x^{q-r}\, x^{r-p}$ is equal to **[1]**

a) x^{pqr} b) 0

c) 1 d) x

15. If $\sqrt{5}$ = 2.236, then $\frac{1}{\sqrt{5}}$ **[1]**

a) 4.472 b) 0.4472

c) 0.04472 d) 44.72

16. $(625)^{0.16} \times (625)^{0.09}$ = **[1]**

a) 25 b) 125

c) 5 d) 625

17. If $2^{-m} \times \frac{1}{2^m} = \frac{1}{4}$, then $\frac{1}{14}\left\{(4^m)^{\frac{1}{2}} + \left(\frac{1}{5^m}\right)^{-1}\right\}$ is equal to **[1]**

a) 2 b) $-\frac{1}{4}$

c) 4 d) $\frac{1}{2}$

18. The simplest form of $0.5\overline{7}$ is **[1]**

a) $\frac{26}{45}$ b) $\frac{57}{100}$

c) $\frac{57}{99}$ d) $\frac{57}{90}$

19. The value of $\sqrt[4]{(64)^{-2}}$ is **[1]**

a) $\frac{1}{4}$ b) $\frac{1}{8}$

c) $\frac{1}{16}$ d) $\frac{1}{2}$

20. The product of a rational number and an irrational number is **[1]**

a) a rational number only
b) an integer
c) an irrational number only
d) both rational and irrational number

21. The value of $\frac{x^{a(b-c)}}{x^{b(a-c)}} \div \left(\frac{x^b}{x^a}\right)^c$ is **[1]**

a) 3
b) 4
c) 1
d) 2

22. $(6+\sqrt{27})-(3+\sqrt{3})+(1-2\sqrt{3})$ when simplified is **[1]**

a) negative and rational
b) positive and rational
c) positive and irrational
d) negative and irrational

23. The decimal expansion of the number $\sqrt{2}$ is **[1]**

a) non-terminating non-recurring
b) non-terminating recurring
c) a finite decimal
d) 1.41421

24. Who was the first Mathematician to compute digits in the decimal expansion of π? **[1]**

a) Archimedes
b) Cantor
c) Dedekind
d) Aryabhatta

25. The decimal form of $\frac{2}{11}$ is **[1]**

a) 0.018
b) $0.\overline{18}$
c) $0.0\overline{18}$
d) 0.18

26. The value of $\left(\frac{81}{16}\right)^{\frac{-3}{4}} \times \left\{\left(\frac{25}{9}\right)^{\frac{-3}{2}} \div \left(\frac{5}{2}\right)^{-3}\right\}$ is **[1]**

a) 4
b) 3
c) 1
d) 2

27. If $\sqrt{2} = 1.4142$, then $\sqrt{\frac{\sqrt{2}-1}{\sqrt{2}+1}}$ is equal to **[1]**

a) 0.4142
b) 5.8282
c) 0.1718
d) 2.4142

28. The value of $\sqrt{3-2\sqrt{2}}$, is **[1]**

a) $\sqrt{2}-1$
b) $\sqrt{2}+1$
c) $\sqrt{3}+\sqrt{2}$
d) $\sqrt{3}-\sqrt{2}$

29. $(-2-\sqrt{3})(-2+\sqrt{3})$ when simplified is **[1]**

a) positive and rational
b) positive and irrational
c) negative and rational
d) negative and irrational

30. The smallest irrational number by which $\sqrt{20}$ should be multiplied so as to get a rational number, is: **[1]**

a) $\sqrt{20}$
b) 5

c) $\sqrt{2}$ d) $\sqrt{5}$

31. **Assertion (A):** 0.271 is a terminating decimal and we can express this number as $\frac{271}{1000}$ which is of the form $\frac{p}{q}$, where p and q are integers and q $\neq$ 0. **[1]**

Reason (R): A terminating or non-terminating decimal expansion can be expressed as rational number.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

32. **Assertion (A):** Rational number lying between two rational numbers a and b is $\frac{a+b}{2}$. **[1]**

Reason (R): There is one rational number lying between any two rational numbers.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

33. **Assertion (A):** 5 - $\sqrt{2}$ = 5 - 1.414 = 3.586 is an irrational number. **[1]**

Reason (R): The difference of a rational number and an irrational number is an irrational number.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

34. **Assertion (A):** $2+\sqrt{6}$ is an irrational number. **[1]**

Reason (R): Sum of a rational number and an irrational number is always an irrational number.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

35. **Assertion (A):** Every integer is a rational number. **[1]**

Reason (R): Every integer m can be expressed in the form $\frac{m}{l}$.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

36. **Assertion (A):** $\sqrt{3}$ is an irrational number. **[1]**

Reason (R): The sum of a rational number and an irrational number is an irrational number.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

37. **Assertion (A):** $17^2 \cdot 17^6 = 17^3$ **[1]**

Reason (R): If a > 0 be a real number and p and q be rational numbers. Then $a^p \cdot a^q = a^{p+q}$.

a) Both A and R are true and R is the
b) Both A and R are true but R is not the

correct explanation of A.

c) A is true but R is false.

correct explanation of A.

d) A is false but R is true.

38. **Assertion (A):** $\sqrt{3}$ is an irrational number. **[1]**

Reason (R): Square root of a positive integer which is not a perfect square is an irrational number.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

39. **Assertion (A):** $\sqrt{2}, \sqrt{3}$, are examples of irrational numbers. **[1]**

Reason (R): An irrational number can be expressed in the form $\frac{p}{q}$.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

40. **Assertion (A):** $\sqrt{2}$ is an irrational number. **[1]**

Reason (R): A number is called irrational if it cannot be written in the form $\frac{p}{q}$, where p and q are integers and q $\neq$ 0.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

Section B

41. Find: $32^{\frac{1}{5}}$ **[2]**

42. Simplify the product $\sqrt[3]{2} \cdot \sqrt[4]{2} \cdot \sqrt[12]{32}$. **[2]**

43. Simplify: $\sqrt{45} - 3\sqrt{20} + 4\sqrt{5}$ **[2]**

44. Write the decimal form :$\frac{11}{24}$ **[2]**

45. Express $\frac{-17}{8}$ in the decimal form by long division method. **[2]**

46. Evaluate by removing the radical sign and negative indices wherever it occurs: $w^2 = 27$ **[2]**

47. Give two rational numbers between 0.515115111511115... and 0.5353353335 ... **[2]**

48. Simplify: $\frac{2+\sqrt{3}}{2-\sqrt{3}} - \frac{2-\sqrt{3}}{2+\sqrt{3}}$. **[2]**

49. Simplify: $(3\sqrt{5} - 5\sqrt{2})(4\sqrt{5} + 3\sqrt{2})$ **[2]**

50. Express $\frac{3}{\sqrt{3}-\sqrt{2}+\sqrt{5}}$ with rational denominator. **[2]**

51. Express the decimal $1.3\overline{23}$ in the form $\frac{p}{q}$, where p, q are integers and q $\neq$ 0. **[2]**

52. Assuming that x, y, z are positive real number, simplify: $\sqrt[5]{x^4\sqrt[4]{x^3\sqrt[3]{x^2\sqrt{x}}}}$. **[2]**

Section C

53. Solve the equation for x: $2^{2x} - 2^{x+3} + 3 + 2^4 = 0$ **[3]**

54. Find the value to three places of decimal. It is given that $\sqrt{2}$ =1.414, $\sqrt{3}$=1.732, $\sqrt{5}$= 2.236 and $\sqrt{10}$ =3.162 **[3]**

$\frac{\sqrt{10}+\sqrt{15}}{\sqrt{2}}$

55. Simplify $\left\{\left[625^{\frac{-1}{2}}\right]^{-\frac{1}{4}}\right\}^2$ **[3]**

56. Solve the equation for x: $3^{2x+4} + 1 = 2 \times 3^{x+2}$ **[3]**

57. Find the decimal expansion of $\frac{1}{7}$. Can you predict what the decimal expansions of $\frac{2}{7}, \frac{3}{7}, \frac{4}{7}, \frac{5}{7}, \frac{6}{7}$ are, without actually doing the long division? If so, how? **[3]**

58. Locate $\sqrt{13}$ on the number line. **[3]**

59. Express $0.\overline{001}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$ **[3]**

60. Construct the "square root spiral". **[3]**

61. Simplify: $(256)^{-\left(4^{-\frac{3}{2}}\right)}$. **[3]**

62. Simplify the following by rationalizing the denominator : $\frac{\sqrt{5}-2}{\sqrt{5}+2} - \frac{\sqrt{5}+2}{\sqrt{5}-2}$ **[3]**

Section D

63. **Read the following text carefully and answer the questions that follow:** **[4]**

Democracy has given people a powerful right- that is to VOTE. In India, every citizen over 18 years of age has the right to vote. Instead of enjoying it as a holiday, one must vote if he/she truly wants to contribute to the nation-building process and bring about a change.

A survey was done in a small area in which $\sqrt{9+2x} - \sqrt{2x}$ voters were men and $\frac{5}{\sqrt{9+2x}}$ voters were women.

i. What is the value of x if the number of men is equal to the number of women? (1)

ii. What is the product of the variables $a^p \cdot a^q$? (1)

iii. Simplify $\frac{7^{\frac{1}{5}}}{7^{\frac{1}{3}}}$. (2)

OR

Is it true that if r is rational and s is irrational, then r + s is irrational? (2)

64. **Read the following text carefully and answer the questions that follow:** **[4]**

In a school 5 out of every 7 children participated in **Save wild life** campaign organised by the school authorities.

i. What is the fraction of students who participated in the campaign? (1)

ii. What is the recurring form of the fraction $\frac{5}{7}$? (1)

iii. How many rational numbers exist between 5 and 7? (2)

OR

Every rational number is a _____ number. (2)

65. **Read the following text carefully and answer the questions that follow:** **[4]**

Real Numbers
N = {1, 2, 3, 4, ...} = Set of all natural numbers
W = {0, 1, 2, 3, 4, ...} = Set of all whole numbers

I = {-2, -1, 0, 1, 2, 3, ...} = Set of all integers

Q = {p/q: p ∈ 1, q ∈ I^+} = Set of all rational numbers

A number which is not rational is irrational number.

The set of all rationals and irrational form set of all real numbers (i.e., R)

Real Numbers are the numbers which include both rational and irrational numbers. Rational numbers are the numbers which can be written in the form of p/q where p and q are integers and q $\neq$ 0. Irrational numbers are those numbers which cannot be expressed as a ratio of two integers.

i. What is the product of two irrational numbers? (1)

ii. How many rational number/numbers lies between two rational numbers? (1)

iii. What is the sum of a rational and irrational number? (2)

OR

Is the number 3.14014001400014... an irrational number? (2)

Section E

66. If $a = \frac{\sqrt{2}+1}{\sqrt{2}-1}$ and $b = \frac{\sqrt{2}-1}{\sqrt{2}+1}$, then find the value of $a^2 + b^2 - 4ab$. **[5]**

67. If $x = \frac{5-\sqrt{3}}{5+\sqrt{3}}$ and $y = \frac{5+\sqrt{3}}{5-\sqrt{3}}$,show that $x - y = -\frac{10\sqrt{3}}{11}$. **[5]**

68. If x is a positive real number and exponents are rational numbers, simplify **[5]**
$\left(\frac{x^b}{x^c}\right)^{b+c-a} \cdot \left(\frac{x^c}{x^a}\right)^{c+a-b} \cdot \left(\frac{x^a}{x^b}\right)^{a+b-c}$.

69. If $\frac{9^n \times 3^2 \times \left(3^{-n/2}\right)^{-2} - (27)^n}{3^{3m} \times 2^3} = \frac{1}{27}$, prove that m - n = 1. **[5]**

70. If $a = 3 - 2\sqrt{2}$, find the value of $a^2 - \frac{1}{a^2}$. **[5]**

71. Simplify: $\frac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}} - \frac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}} - \frac{3\sqrt{2}}{\sqrt{15}+3\sqrt{2}}$. **[5]**

72. If $x = \frac{5-\sqrt{21}}{2}$, prove that $\left(x^3 + \frac{1}{x^3}\right) - 5\left(x^2 + \frac{1}{x^2}\right) + \left(x + \frac{1}{x}\right) = 0$. **[5]**

73. Find the values of a and b if $\frac{7+3\sqrt{5}}{3+\sqrt{5}} - \frac{7-3\sqrt{5}}{3-\sqrt{5}} = a + b\sqrt{5}$. **[5]**

74. If x = 2 - $\sqrt{3}$, find the value of $\left(x - \frac{1}{x}\right)^3$. **[5]**

75. Represent each of the numbers $\sqrt{5}, \sqrt{6}$ and $\sqrt{7}$ the real line. **[5]**