

Very-Very Short Answer Type (1 Mark)

1. If $x=2$ and $y=4$, then $\left(\frac{x}{y}\right)^{x-y} + \left(\frac{y}{x}\right)^{y-x} = \dots\dots\dots$
2. $\frac{(32)^{0.2} + (81)^{0.25}}{(256)^{0.5} - (121)^{0.5}} = \dots\dots\dots$
3. $\frac{3}{7}$ lies between $\frac{42}{99}$ and $\dots\dots\dots$
4. Express $0.\overline{32}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$
5. The number $0.318564318564318564\dots\dots$ is a $\dots\dots\dots$ number.
6. Express $0.\overline{7}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.
7. Find the value of $0.\overline{23} + 0.\overline{22}$.
8. Find the Value of $[3-4(3-4)^4]^3$
9. The cube root of 125 divided by square root of 25, is $\dots\dots\dots$.
10. If $y^2 = 625$ then y is a $\dots\dots\dots$ number.
11. $2\sqrt{(81)^{2.5}} = \dots\dots\dots$.
12. Find the value of x , if $5^{x-3} \cdot 3^{2x-8} = 225$.
13. If $a = 2 + \sqrt{3}$, then the value of $\frac{1}{a} = \dots\dots\dots$
14. Which number is the smallest natural number ?
15. Which of the number out of $\sqrt{2}$, $\sqrt{4}$, $\sqrt{9}$ and $\sqrt{25}$ is not a rational number ?
16. $\dots\dots\dots$ is a whole number but not a natural number.
17. The decimal expansion of the number $\sqrt{3}$ is non- $\dots\dots$ and $\dots\dots$.
18. Find a rational number between $-\frac{2}{3}$ and $\frac{1}{4}$.
19. Which of $\sqrt{\frac{4}{9}}$, $\sqrt{81}$, $\frac{\sqrt{12}}{\sqrt{3}}$ and $\sqrt{7}$ is an irrational number ?
20. Give example of two irrational number the product of which is a rational number.
21. $\sqrt{6} \times \sqrt{8} = \dots\dots\dots$
22. After rationalising the denominator of $\frac{3\sqrt{2}}{3\sqrt{2} - 2\sqrt{2}}$, we get the denominator as $\dots\dots\dots$.
23. $[\sqrt{a^3}]^{\frac{2}{3}} = \dots\dots\dots$.

24. Every rational number is a _____ number.
25. Find a rational number between $\sqrt{2}$ and $\sqrt{3}$.

Fill in the blanks

26. The sum of a rational and an irrational numbers is always _____ number.
27. The difference of a rational and an irrational number is always _____ number.
28. The decimal expansion of every rational number is either _____ or non - terminating _____.
29. The decimal expansion of every irrational number is always _____.
30. Every number whose decimal expansion is non-terminating non-recurring is _____ number.
31. Between two distinct rational numbers there lie _____ rational numbers.
32. Between two distinct rational numbers there lie _____ irrational numbers.
33. Between two distinct irrational numbers there lie _____ rational numbers.
34. The reciprocal of every (non-zero) rational number is a _____ number.
35. Write first five whole numbers in $\frac{p}{q}$ form, where p and q are integers and $q \neq 0$
36. Find decimal expansion of $\frac{17}{8}, \frac{3}{15}, \frac{2}{7}, \frac{50}{3}$.
37. Find four rational numbers between $\frac{2}{9}$ and $\frac{3}{7}$.
38. Find decimal for of $\sqrt{23}$ and $\sqrt{24}$ upto 3 decimal places.
39. Find two irrational numbers between $\sqrt{23}$ and $\sqrt{24}$.
40. Find one irrational and one rational number between 2 and $\sqrt{5}$.
41. Write two numbers whose decimal expansions are terminating.
42. What can be the maximum number of digits in the repeating block of digits in the decimal expansion of $\frac{5}{7}$?

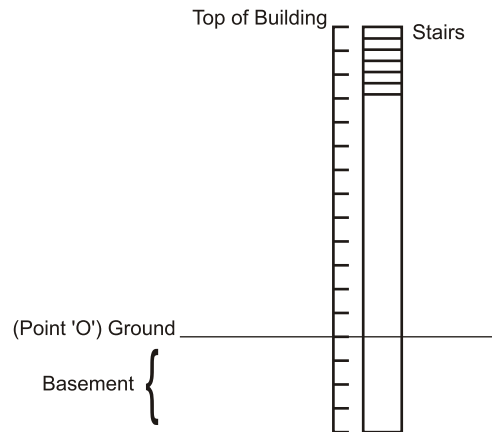
43. Write two numbers whose decimal expansions are non-terminating non-repeating (non-recurring).
44. Find the value of $(256)^{0.16} \times (256)^{0.09}$
45. Find two irrational numbers between 2016 and 2017.

Case Study Based Questions [46-47]

46. Case Study-1

A building has 13 floors above and 4 floors below the ground (basement). Stairs Run from the lowest ground of the basement to the top of the building. Ramesh is standing on the ground. If that point is considered "0" and after every 4 steps of stairs, either above or below, he counts "1". Also, below the ground he counts negative numbers.

Represent his position by number in each of the following cases-

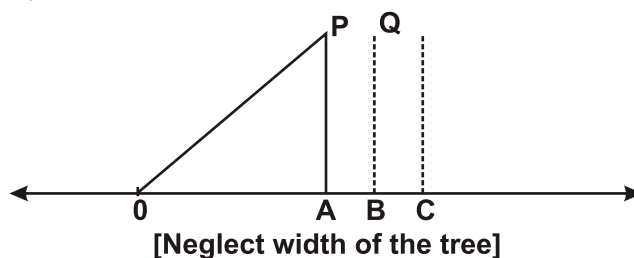


- (i) If he has climbed 16 stairs above
 (a) 2 (b) 3 (c) 4 (d) 16
- (ii) If he has gone three steps below the ground
 (a) $\frac{3}{4}$ (b) $-\frac{3}{4}$ (c) -0.75 (d) b & c
- (iii) If he has climbed seven steps above the ground
 (a) $7/4$ (b) $-7/4$ (c) 1.75 (d) b and c (e) a and c
- (iv) If he has gone 15 steps below the ground
 (a) $15/4$ (b) $-15/4$ (c) 3.75 (d) a and c (e) b and c
- (v) Name the numbers used to represent his location position.
 (a) Natural (b) Whole (c) Integers (d) Real

47. Case Study 2-

A school wants to plant trees in a row as distance shown in the figure Height of each tree is considered equal and is taken as 1 unit. Distance OA is also 1 unit. First Tree is planted at Point B & second at C.

Consider point 'O' as the zero of the line and $OB=OP$, $OC=OQ$, then



- (i) Distance OB will be
 (a) 1 unit (b) 2 unit (c) $\sqrt{1}$ unit (d) $\sqrt{2}$ units
- (ii) Distance OC will be
 (a) $\sqrt{3}$ units (b) $\sqrt{2}$ units (c) 2 units (d) 3 units
- (iii) Simplifying $\frac{1}{OB}$, we get
 (a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{2}$ (c) $\frac{\sqrt{2}}{2}$ (d) $\frac{2}{\sqrt{2}}$
- (iv) Making denominator of $\frac{OB}{OC}$ rational, we get
 (a) $\frac{\sqrt{6}}{3}$ (b) 2 (c) $\frac{\sqrt{2}}{3}$ (d) $\frac{\sqrt{3}}{3}$
- (v) Simplifying the reciprocal of difference (OC-OB)
 (a) $\frac{1}{\sqrt{3}-\sqrt{2}}$ (b) 1 (c) $\sqrt{3}+\sqrt{2}$ (d) $-(\sqrt{2}+\sqrt{3})$

Very Short answer type Questions (2 Marks)

48. Represent $\frac{-7}{5}$ and $\frac{11}{5}$ on the number line.
49. Represent following on number line
 i) $\sqrt{5}$ ii) $\sqrt{3}$ iii) $\sqrt{2}$
50. Insert two irrational numbers between $\frac{2}{3}$ and $\frac{3}{2}$
51. Simplify : $\frac{\sqrt{5} + \sqrt{3}}{\sqrt{80} + \sqrt{48} - \sqrt{45} - \sqrt{27}}$
52. Find the value of $[1^3 + 2^3 + 3^3 + 8^2]^{-5/2}$
53. Find the value of x if $x^{1/2} = (36)^{0.5}$
54. Find the value of x if $(\sqrt{3})^x = 3^7$

55. If $2^{5x} \div 2^x = \sqrt[5]{32}$. Then find the value of x.
56. Evaluate $a^{x-y} \cdot a^{y-z} \cdot a^{z-x}$.
57. Simplify $12^{\frac{2}{5}} \cdot 5^{\frac{2}{5}}$.
58. Which of the following rational numbers will have a terminating decimal expansion or a non-terminating repeating (recurring) decimal expansion ?
- (i) $\frac{135}{50}$ (ii) $\frac{4}{11}$ (iii) $\frac{8}{7}$ (iv) $6\frac{3}{8}$
- (v) $\frac{55}{9}$ (vi) $\frac{5^2 \times 3^3}{2 \times 5^3 \times 27}$ (vii) $\frac{51}{60}$.
59. Classify the following numbers as terminating decimal or non-terminating recurring decimal or non-terminating non-recurring decimal :
- (i) 0.1666... (ii) 0.250 (iii) 1.01001000100001....
- (iv) 0.27696 (v) 2.142857142857.... (vi) $0.\overline{3}$
- (vii) 0.2359872785... (viii) 0.484848848.... (ix) 2.502500250002.....
- (x) $4.\overline{123456789}$

Also classify these given numbers as Rational and Irrational numbers.

60. Classify the following numbers as rational or Irrational number :
- (i) $\sqrt{27}$ (ii) $\sqrt{36}$ (iii) $\sqrt{5} \times \sqrt{125}$ (iv) $2\sqrt{3}$
- (v) $\frac{7\sqrt{7}}{\sqrt{343}}$ (vi) $2 + \sqrt{21}$ (vii) $5 + 2\sqrt{23} - (\sqrt{25} + \sqrt{92})$
- (viii) $\frac{22}{7}$ (ix) π (x) $\sqrt[3]{27}$
61. Express the following numbers in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.
- (i) 0.0875 (ii) 2.123456789 (iii) 0.181818.....

(iv) $0.4\overline{37}$ (v) $3.6\overline{51}$

62. Do as directed :

(i) Add : $\sqrt{125} + 2\sqrt{27}$ and $-5\sqrt{5} - \sqrt{3}$

(ii) Add : $\sqrt{7} - \sqrt{11}$ and $\sqrt{5} - \sqrt{11} + \sqrt{13}$

(iii) Multiply : $2\sqrt{2}$ by $5\sqrt{2}$.

(iv) Multiply : $(-3 + \sqrt{5})$ by 3.

(v) Divide : $7\sqrt{5}$ by $-14\sqrt{125}$

(vi) Divide : $2\sqrt{216} - 3\sqrt{27}$ by 3.

Short answer type questions (3 Marks)

63. Simplify :

(i) $(2\sqrt{2} + 3\sqrt{3})(2\sqrt{2} - 3\sqrt{3})$ (ii) $(2\sqrt{8} - 3\sqrt{2})^2$

(iii) $(\sqrt{7} + \sqrt{6})^2$ (iv) $(6 - \sqrt{2})(2 + \sqrt{3})$ (v) $(9 + \sqrt{2} - \sqrt{3})^2$

64. Evaluate :

(i) $\frac{2^{38} + 2^{37} + 2^{36}}{2^{39} + 2^{38} + 2^{37}}$ (ii) $\left[\left(64^{\frac{1}{2}} \right)^{\frac{1}{6}} \right]^2$

65. Find the value of a if $\frac{6}{3\sqrt{2} - 2\sqrt{3}} = 3\sqrt{2} - a\sqrt{3}$.

66. Simplify : $\left[5(8^{1/3} + 27^{1/3})^3 \right]^{1/4}$

67. Simplify : $\frac{(25)^{3/2} \times (243)^{3/5}}{(16)^{5/4} \times (8)^{4/3}}$

68. If $5^{2x-1} - (25)^{x-1} = 2500$, then find the value of x.

69. Express $0.6 + 0.\overline{7} + 0.4\overline{7}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

70. Rationalise the denominator of (i) $\frac{1}{\sqrt{3} + \sqrt{5} + \sqrt{7}}$ (ii) $\frac{2}{\sqrt{2} - \sqrt{3} + \sqrt{5}}$

71. Find a and b if $\frac{7 + 3\sqrt{5}}{2 + \sqrt{5}} - \frac{7 - 3\sqrt{5}}{2 - \sqrt{5}} = a + b\sqrt{5}$

72. If $x = (3 - 2\sqrt{2})$, show that $\left(\sqrt{x} - \frac{1}{\sqrt{x}}\right) = \pm 2$

73. If $xyz = 1$, then simplify

$$(1 + x + y^{-1})^{-1} \times (1 + y + z^{-1})^{-1} \times (1 + z + x^{-1})^{-1}$$

74. Find the value of x if

(i) $25^{2x-3} = 5^{2x+3}$

(ii) $(4)^{2x-1} - (16)^{x-1} = 384$

Long Answer Question (5 Marks)

75. Evaluate : $\frac{64^{\frac{a}{6}}}{4^a} \times \frac{2^{2a+1}}{2^{a-1}}$

76. Simplify : $\frac{1}{1 + x^{b-a} + x^{c-a}} + \frac{1}{1 + x^{a-b} + x^{c-b}} + \frac{1}{1 + x^{a-c} + x^{b-c}}$

77. Simplify : $\left(\frac{x^a}{x^{-b}}\right)^{a-b} \times \left(\frac{x^b}{x^{-c}}\right)^{b-c} \times \left(\frac{x^c}{x^{-a}}\right)^{c-a}$

78. Show that :

$$\frac{1}{(3 - \sqrt{8})} - \frac{1}{(\sqrt{8} - \sqrt{7})} + \frac{1}{(\sqrt{7} - \sqrt{6})} - \frac{1}{(\sqrt{6} - \sqrt{5})} + \frac{1}{(\sqrt{5} - 2)} = 5$$

79. If $a = \frac{\sqrt{7} - \sqrt{6}}{\sqrt{7} + \sqrt{6}}$ and $b = \frac{\sqrt{7} + \sqrt{6}}{\sqrt{7} - \sqrt{6}}$, then find the value of $a^2 + b^2 + ab$.

80. Simplify : $\frac{2\sqrt{6}}{\sqrt{2} + \sqrt{3}} + \frac{6\sqrt{2}}{\sqrt{6} + \sqrt{3}} - \frac{8\sqrt{3}}{\sqrt{6} + \sqrt{2}}$

81. If $x = 9 - 4\sqrt{5}$, then find

(i) $x + \frac{1}{x}$ (ii) $x - \frac{1}{x}$ (iii) $x^2 + \frac{1}{x^2}$ (iv) $x^2 - \frac{1}{x^2}$

(v) $x^3 + \frac{1}{x^3}$ (vi) $x^3 - \frac{1}{x^3}$ (vii) $\sqrt{x} + \frac{1}{\sqrt{x}}$ (viii) $\sqrt{x} - \frac{1}{\sqrt{x}}$

$$(ix) \ x^4 + \frac{1}{x^4} \quad (x) \ x^6 + \frac{1}{x^6} \quad (xi) \ x + \frac{14}{x}$$

82. If $a = 1 + \sqrt{7}$, find the value of $\frac{-6}{a}$

83. If $p = 5 - 2\sqrt{6}$, Find $p^2 + \frac{1}{p^2}$ and $p^2 - \frac{1}{p^2}$

84. Express $0.\overline{3178}$ in the form of p/q where p and q are integers and $q \neq 0$.

85. If $\sqrt{2} = 1.414$, then find the value of $\sqrt{8} + \sqrt{50} + \sqrt{72} + \sqrt{98}$

86. Find the value of

$$\frac{4}{(216)^{\frac{-2}{3}}} + \frac{1}{(256)^{\frac{-3}{4}}} + \frac{2}{(243)^{\frac{-1}{5}}}$$

CHAPTER-1
NUMBER SYSTEMS
ANSWERS

1. 8
2. 1
3. $\frac{42}{99}, \frac{4}{9}$
4. 29/90
5. rational
6. $\frac{7}{9}$
7. $0.\overline{45}$ or $\frac{45}{99}$
8. -1
9. 1
10. rational
11. 243
12. 5
13. $2 - \sqrt{3}$
14. 1
15. $\sqrt{2}$

16. 0
17. Terminating non-recurring
18. $\frac{-5}{24}$ or any other appropriate us.
19. $\sqrt{7}$
20. Any correct - example
21. $4\sqrt{3}$
22. 19
23. a
24. Real
25. 1.5 or any other appropriate number
26. an irrational
27. an irrational
28. Terminating, recurring
29. non-terminating non-recurring
30. an irrational
31. infinitely many
32. infinitely many
33. infinitely many
34. rational
35. $\frac{0}{1}, \frac{1}{1}, \frac{2}{1}, \frac{3}{1}, \frac{4}{1}$
36. $\frac{17}{8} = 2.125, \frac{3}{15} = 0.2, \frac{2}{7} = 0.\overline{285714}, \frac{50}{3} = 16.\bar{6}$
37. $\frac{15}{63}, \frac{16}{63}, \frac{17}{63}, \frac{18}{63}$ (other answers are also possible).
38. $\sqrt{23} = 4.795, \sqrt{24} = 4.898$
39. 4.8010010001, 4.8020020002, (other answers are also possible)

40. 2.1, 2.010010001, (other answers are possible).
42. 6
44. 4
45. 2016.1010010001 ; 2016.2020020002; (other answers are possible)
46. (i) (c) (ii) (d)
(iii) (e) (iv) (b)
(v) (c)
47. (i) (d) (ii) (a)
(iii) (c) (iv) (a)
(v) (c)
50. 0.909009000.....; 1.10100100010000..... (other answers are also possible)
51. 1
52. $\frac{1}{10^5}$
53. 36
54. 14
55. $x = \frac{1}{4}$
56. 1
57. $(60)^{2/5}$
58. (i) Terminating Decimal (ii) Non Terminating Repeating Decimal
(iii) Non-Terminating Repeating Decimal
(iv) Terminating Decimal (v) Non-Terminating repeating Decimal
(vi) Terminating Decimal (vii) Terminating Decimal

59. (i) Non-Terminating Repeating Decimal (Rational).
 (ii) Terminating Decimal (Rational).
 (iii) Non-Terminating Non-Repeating Decimal (Irrational).
 (iv) Terminating Decimal (Rational)
 (v) Non-Terminating Repeating Decimal (Rational)
 (vi) Non-Terminating Repeating Decimal (Rational)
 (vii) Non-Terminating Non-Repeating Decimal (Irrational)
 (viii) Non-Terminating Non-Repeating Decimal (Irrational)
 (ix) Non-Terminating Non-Repeating Decimal (Irrational)
 (x) Non-Terminating Repeating Decimal (Rational).
60. (i) Irrational (ii) Rational (iii) Rational (iv) Irrational
 (v) Rational (vi) Irrational (vii) Rational (viii) Rational
 (ix) Irrational (x) Rational
61. (i) $0.0875 = \frac{7}{80}$ (ii) $\frac{2123456789}{1000000000}$ (iii) $\frac{2}{11}$
 (iv) $\frac{433}{990}$ (v) $\frac{1643}{450}$
62. (i) $5\sqrt{3}$ (ii) $\sqrt{5} - 2\sqrt{11} + \sqrt{7} + \sqrt{13}$ (iii) 20
 (iv) $-9 + 3\sqrt{5}$ (v) $-\frac{1}{10}$ (vi) $4\sqrt{6} - 3\sqrt{3}$
63. (i) -19 (ii) 2 (iii) $13 + 2\sqrt{42}$
 (iv) $12 + 6\sqrt{3} - 2\sqrt{2} - \sqrt{6}$ (v) $14 + 18\sqrt{2} - 2\sqrt{6} - 18\sqrt{3}$
64. (i) $\frac{1}{2}$ (ii) 2
65. $a = -2$ 66. 5 67. $\frac{3375}{512}$
68. $x = 3$ 69. $\frac{167}{90}$

$$\begin{aligned}
 70. \quad & \overset{\text{Hint}}{\frac{1}{(\sqrt{3}+\sqrt{5})+\sqrt{7}}} \times \frac{(\sqrt{3}+\sqrt{5})-\sqrt{7}}{(\sqrt{3}+\sqrt{5})-\sqrt{7}} \\
 &= \frac{\sqrt{3}+\sqrt{5}-\sqrt{7}}{(\sqrt{3}+\sqrt{5})^2-(\sqrt{7})^2} = \frac{\sqrt{3}+\sqrt{5}-\sqrt{7}}{3+5+2\sqrt{15}-7} \\
 &= \frac{\sqrt{3}+\sqrt{5}-\sqrt{7}}{1+2\sqrt{15}} \times \frac{1-2\sqrt{15}}{1-2\sqrt{15}}
 \end{aligned}$$

$$\text{Ans. (i) } \frac{1}{59} (9\sqrt{3} + 5\sqrt{5} + \sqrt{7} - 2\sqrt{105}) \quad \text{(ii) } 3\sqrt{2} - 2\sqrt{3} + \sqrt{30}$$

$$71. \quad a=0, \quad b=2$$

$$73. \quad \frac{1}{(1+y+xy)(1+z+yz)(1+x+zx)}$$

$$74. \quad \text{(i) } 9/2 \quad \text{(ii) Hint - } 4^{2x-1} - 16^{x-1} = 384$$

$$2^{4x-2} - 2^{4x-4} = 2^7 \times 3$$

$$2^{4x} \left[\frac{1}{2^2} - \frac{1}{2^4} \right] = 2^7 \times 3$$

$$= 2^{4x-4} \times 3 = 2^7 \times 3$$

$$\times = \frac{11}{4}$$

$$75. \quad 4$$

$$76. \quad 1$$

$$77. \quad 1$$

$$79. \quad a^2 + b^2 + ab = 675$$

$$80. \quad 0$$

$$\begin{aligned}
 81. \quad & \overset{\text{Hint-}}{\frac{1}{x}} = \frac{1}{9-4\sqrt{5}} \times \frac{9+4\sqrt{5}}{9+4\sqrt{5}} \\
 &= \frac{9+4\sqrt{5}}{81-80} = 9+4\sqrt{5} \\
 & x + \frac{1}{x} = 9-4\sqrt{5} + 9+4\sqrt{5} = 18 \\
 & x - \frac{1}{x} = 9-4\sqrt{5} - 9-4\sqrt{5} = -8\sqrt{5}
 \end{aligned}$$

$$\begin{aligned}
 \text{(vi)} \quad & \left(x - \frac{1}{x}\right)^3 = x^3 - \frac{1}{x^3} - 3x \frac{1}{x} \left(x - \frac{1}{x}\right) \\
 & (-8\sqrt{5})^3 = \left(x^3 - \frac{1}{x^3}\right) - 3(-8\sqrt{5}) \\
 & \left(x^3 - \frac{1}{x^3}\right) = -2584\sqrt{5}
 \end{aligned}$$

$$\begin{aligned} \text{(vii)} \quad (\sqrt{x} + \frac{1}{\sqrt{x}})^2 &= (x + \frac{1}{x}) + 2 \\ &= 18 + 2 \end{aligned}$$

$$\sqrt{x} + \frac{1}{\sqrt{x}} = \sqrt{20} = 2\sqrt{5}$$

$$\begin{aligned} \text{(ix)} \quad (x^2 + \frac{1}{x^2})^2 &= x^4 + \frac{1}{x^4} + 2 \\ (x^2 + \frac{1}{x^2})^2 - 2 &= x^4 + \frac{1}{x^4} \end{aligned}$$

Ans. (i) 18

(ii) $-8\sqrt{5}$

(iii) 322

(iv) $-144\sqrt{5}$

(v) 5778

(vi) $-2584\sqrt{5}$

(vii) $2\sqrt{5}$

(viii) 4

(ix) 103682

(x) 33385282

(xi) $8\sqrt{3} - 14\sqrt{2}$

82. $1 - \sqrt{7}$

83. 98, $-40\sqrt{6}$

84. $\frac{635}{1998}$

85. 28.28

86. Hint-

$$= \frac{4}{(6^3)^{-2/3}} + \frac{1}{(4^4)^{-3/4}} + \frac{2}{(3^5)^{-1/5}}$$

$$= \frac{4}{6^{-2}} + \frac{1}{4^{-3}} + \frac{2}{3^{-1}}$$

$$= 214$$

Practice Test

NUMBER SYSTEMS

Time : 1 Hr.

M.M. 25

1. If $\frac{4}{a} = \frac{a^2}{16}$, then check whether a is rational or irrational number. (1)
2. Find two irrational numbers between $\sqrt{2}$ and $\sqrt{3}$. (1)
3. If $P = 5 - 2\sqrt{6}$, Find $\frac{1}{P^2}$ (1)
4. Simplify:

$$4\sqrt{3} + 3\sqrt{48} - \frac{5}{2}\sqrt{\frac{4}{3}}$$
 (2)
5. If $\sqrt{3} = 1.732$, find the value of $\frac{2}{\sqrt{3} - 1}$ (2)
6. If $(5)^{2x-1} - (25)^{x-1} = 2500$
then find the value of 'x' (2)
7. Find the value of x and y (3)

$$\frac{\sqrt{11} - \sqrt{7}}{\sqrt{11} + \sqrt{7}} = a - b\sqrt{77}$$
8. Represent $(2 + \sqrt{3})$ on the number line. (3)
9. Simplify : (5)

$$\frac{16 \times 2^{a+1} - 4 \times 2^a}{16 \times 2^{a+2} - 2 \times 2^{a+2}}$$
10. Express the following in the form $\frac{p}{q}$ where p and q are integers and $q \neq 0$ (5)
 $0.\overline{4} + 0.1\overline{8}$