MATHS

BOOKS - HT Olympiad Previous Year Paper

NUMBER SYSTEMS

Mathematical Reasoning

1. If $2^{x-3}.3^{2x-8} = 36$, then the value of x is _____.

A. 2

B. 5

C. 3

D. 1

Answer: B

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2. If $N = \frac{\sqrt{\sqrt{5}+2}+\sqrt{\sqrt{5}-2}}{\sqrt{\sqrt{5}+1}} - \sqrt{3-2\sqrt{2}}$ then $\sqrt{N}$ equals___

A. 1

B. $2\sqrt{2}-1$

C. $\frac{\sqrt{5}}{2}$

D. $\frac{2}{\sqrt{\sqrt{5}+1}}$

Answer: A

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3. Express the mixed recurring decmal $1.\overline{27}$ in the form $\frac{p}{q}$

A. $\frac{8}{11}$

B. $\frac{14}{11}$

C. $\frac{14}{25}$

D. $\frac{8}{17}$

Answer: B

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4. $x = 5 - 2\sqrt{6}$, find $x^2 + \frac{1}{x^2}$

A. 58

B. 0

C. 98

D. 12

Answer: C

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

A. 1

B. 2

C. $\frac{1}{2}$

D. 3

Answer: A

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6. The rationalising factor of $\sqrt[5]{a^2b^3c^4}$ is

A. $\sqrt[5]{a^3b^2c}$

B. $\sqrt[4]{a^3b^2c}$

C. $\sqrt[3]{a^3b^2c}$

D. $\sqrt{a^3b^2c}$

Answer: A

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7. Rational number $\frac{-19}{2}$ lies between consecutive integers____

A. -2 and -1

B. -7 and -8

C. -6 and -7

D. -9 and -10

Answer: D

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8. An irrational number between $\frac{3}{8}$ and $\frac{5}{8}$ is _____

A. $\frac{1}{2}\left(\frac{3}{8}+\frac{5}{8}\right)$

B. $\left(\frac{3}{8}\times\frac{5}{8}\right)$

C. $\sqrt{\frac{3}{8}\times\frac{5}{8}}$

D. None of these

Answer: C

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9. Arrange in descending order of magnitude $\sqrt[3]{2}$, $\sqrt[6]{3}$, $\sqrt[9]{4}$.

A. $\sqrt[9]{4}$, $\sqrt[6]{3}$, $\sqrt[3]{2}$

B. $\sqrt[9]{4}$, $\sqrt[3]{2}$, $\sqrt[6]{3}$

C. $\sqrt[3]{2}$, $\sqrt[6]{3}$, $\sqrt[9]{4}$

D. $\sqrt[6]{3}$, $\sqrt[9]{4}$, $\sqrt[3]{2}$

Answer: A

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10. The greater between $\sqrt{17} - \sqrt{12}$ and $\sqrt{11} - \sqrt{6}$ is

A. $\sqrt{17} - \sqrt{12}$

B. $\sqrt{11} - \sqrt{6}$

C. Both are equal

D. Can't be compared

Answer: B

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11. The value of x if $5^{2x-1} = 25^{x-1} + 100$ is _____.

A. 8

B. 5

C. 2

D. 0

Answer: C

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12. If $x = 2 - \sqrt{3}$, then the values of $x^2 + \frac{1}{x^2}$ and $x^2 - \frac{1}{x^2}$ respectively are

A. $14, 8\sqrt{3}$

B. $-14, -8\sqrt{3}$

C. $14, -8\sqrt{3}$

D. $-14, 8\sqrt{3}$

Answer: C

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13. Which of the following statements is INCORRECT?

A. Every integer is a rational number

B. Every natural number is an integer.

C. Every natural number is a real number.

D. Every real number is a rational number.

Answer: D

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14. If $\frac{3+2\sqrt{5}}{3-2\sqrt{5}} = (p+q\sqrt{5})$, then find the value of $11(p+q)$.

A. 31

B. -41

C. -31

D. -40

Answer: B

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15. The number x = 1.24242424.....can be expressed in the from $x = \frac{p}{q}$, where p and q are positive integer having no common factors. Then the value of p+q is:

संख्या x = 1.24242424....को $x = \frac{p}{q}$ रूप में अभिव्यक्त किया जा सकता है, यहाँ p और q धनात्मक पूर्णांक हैं जिनका समापवर्तक नहीं है, तो p+q का मान क्या होगा?

A. 72

B. 74

C. 41

D. 53

Answer: B

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16. If x and y are positive real numbers then which the following is CORRECT?

A. $x > y \Rightarrow -x > -y$

B. $x > y \Rightarrow -x < -y$

C. $x > y = \frac{1}{x} > \frac{1}{y}$

D. $x > y \Rightarrow \frac{1}{x} < \frac{-1}{y}$

Answer: B

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17. If $x = 1 - \sqrt{2}$, then find the value of $\left(x - \frac{1}{x}\right)^2$.

A. 2

B. 3

C. 4

D. 5

Answer: C

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Achievers Section Hots

1. The value of $\frac{1}{1+\sqrt{2}}+\frac{1}{\sqrt{2}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{5}}+\frac{1}{\sqrt{5}+\sqrt{6}}+\frac{1}{\sqrt{6}+\sqrt{7}}$ is

A. 0

B. 1

C. 2

D. 4

Answer: C

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2. Read the statements carefully,

Statement 1: The product of a rational and an irrational number is an irrational number.

Statement 2: Reciprocal of every rational number is a rational number.

Which of the following options hold?

A. Both Statement -1 and Statement -2 are true.

B. Statement -1 is true but Statement -2 is false.

C. Statement -1 is false but Statement -2 is true.

D. Both Statement -1 and Statement -2 are false.

Answer: B

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3. Match the following :

	Column-I	Column-II
(a)	If $\frac{3}{x+8}=\frac{4}{6-x}$, then x is _____ .	(i) 3
(b)	If $\frac{2^{x-1}\cdot 4^{2x+1}}{8^{x-1}}=64$, then x is _____ .	(ii) $5^{5/2}$
(c)	If $4^x-4^{x-1}=24$, then $(2x)^x$ is _____ .	(iii) –2
(d)	If $4^{x+1}=256$, then x is _____ .	(iv) 1

A. $a \to i, b \to ii, c \to iii, d \to iv$

B. $a \to iii, b \to iv, c \to i, d \to ii$

C. $a \to i, b \to iv, c \to ii, d \to iii$

D. $a \to ii, b \to iv, c \to ii, d \to i$

Answer: D

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