MATHS

BOOKS - HT Olympiad Previous Year Paper

REAL NUMBERS

Mathematical Reasoning

1. Which of the following numbers have terminating decimal expansion?

A. $\dfrac{8}{225}$

B. $\dfrac{5}{18}$

C. $\dfrac{11}{21}$

D. $\dfrac{21}{150}$

Answer: D

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2. A positive integer n when divided by 9, gives 7 as remainder. What will be the remainder when (3n - 1) is divided by 9?

A. 1

B. 2

C. 3

D. 4

Answer: B

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3. $1.22\overline{4}$ can be expressed as a fraction in simplest

form as _____.

A. $\dfrac{450}{551}$

B. $\dfrac{1224}{1000}$

C. $\dfrac{551}{450}$

D. $\dfrac{1000}{1224}$

Answer: C

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4. Given that H.C.F. (306, 954, 1314) = 18, find L.C.M. (306, 954, 1314).

A. 1183234

B. 1123238

C. 1183914

D. 1123328

Answer: C

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5. If 'a' and 'b' are rational numbers and $\dfrac{2 + \sqrt{3}}{2 - \sqrt{3}} = a + b\sqrt{3}$ then $(a + b)^2 = $ _____ .

A. 121

B. 171

C. 116

D. 198

Answer: A

6. If p is prime, then H.C.F. and L.C.M. of p and p+1 would be

    A. H.C.F. = p. L.C.M. = p + 1

    B. H.C.F. = p(p + 1), L.C.M. = 1

    C. H.C.F. = 1, L.C.M. = p(p + 1)

    D. None of these

Answer: C

7. The product of two consecutive natural numbers is always _____.

A. An even number

B. An odd number

C. A prime number

D. Divisible by 3

Answer: A

8. Which of the following is a rational number?

    A. Sum of $2 + \sqrt{3}$ and its inverse

    B. Square root of 18

    C. Square root of $7+4\sqrt{3}$

    D. None of these

Answer: A

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9. The 100th root of $10^{\left(10^{10}\right)}$ is

    A. $10^{8^{10}}$

B. 10^{10^8}

C. $\left(\sqrt{10}\right)^{\left(\sqrt{10}\right)^{10}}$

D. $\sqrt{10}^{\left(\sqrt{(10)}\right)^{\sqrt{10}}}$

Answer: B

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10. $\dfrac{a + \sqrt{a^2 - b^2}}{a - \sqrt{a^2 - b^2}} + \dfrac{a - \sqrt{a^2 - b^2}}{a + \sqrt{a^2 - b^2}}$

A. $\dfrac{a^2}{b^2}$

B. $\dfrac{b^2}{a^2}$

C. $\dfrac{a}{b}$

D. $\dfrac{2(2a^2 - b^2)}{b^2}$

Answer: D

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11. The rationalising factor of $\sqrt[7]{x^3 y^5 z^2}$ is _____.

A. $\sqrt[7]{z^3 y^2 x^5}$

B. $\sqrt[4]{x^3 y^2 z}$

C. $\sqrt{x^4 y^2 z^5}$

D. $\sqrt[7]{y^2 x^4 z^5}$

Answer: D

12. Which of the following is an irrational number ?

A. π

B. $\dfrac{22}{7}$

C. both (A) and (B)

D. Neither (A) nor (B)

Answer: A

13. According to the Fundamental Theorem of Arithmetic, if p (a prime number) divides b^2 and b is positive, then _____.

A. b divides p

B. b^2 divides p

C. p divides b

D. None of these

Answer: C

1. In a seminar the number of participants in Mathematics, Physics and Biology are 192, 240 and 168. Find the minimum number of rooms required, if in each room same number of participants is to be seated and all of them being in the same subject.

A. 20

B. 25

C. 28

D. 30

Answer: B

2. Two tanks contain 504 and 735 litres of milk respectively. Find the maximum capacity of a container which vcan measuere the milk of either tank an exact number of times.

A. 21 litres

B. 7 litres

C. 42 litres

D. 6 litres

Answer: A

3. Anamika wants to form a positive odd integer Her

number cannot be of the form_____.

A. 8p+1

B. 8p + 5

C. 8p + 3

D. 8p + 6

Answer: D

4. Four different electronic devices make a beep after every 30 minutes, 1 hour, $1\dfrac{1}{2}$ hour and 1 hour 45 minutes respectively. All the devices beeped together at 12 noon.They will again beep together at:

    A. 12 midnight

    B. 3 a.m.

    C. 6 a.m.

    D. 9 a.m.

Answer: D

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5. Match the following:

Column-I	Column-II
(P) Rational form of $0.\overline{32}$ is	(i) $\frac{14}{55}$
(Q) Rational form of $0.2\overline{54}$ is	(ii) $\frac{11}{45}$
(R) Rational form of $0.1\overline{2}$ is	(iii) $\frac{32}{99}$
(S) Rational form of $0.2\overline{4}$ is	(iv) $\frac{11}{90}$

A.

$$(P) \rightarrow (iii), (Q) \rightarrow (iv)(R) \rightarrow (i), (S) \rightarrow (ii)$$

B.

$$(P) \rightarrow (iv), (Q) \rightarrow (i), (R) \rightarrow (ii), (S) \rightarrow (iii)$$

C.

$$(P) \rightarrow (iii), (Q) \rightarrow (i), (R) \rightarrow (iv), (S) \rightarrow (ii)$$

D.

$$(P) \rightarrow (i), (Q) \rightarrow (iii), (R) \rightarrow (iv), (S) \rightarrow (ii)$$

Answer: C

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6. A charitable trust donates 28 different books of Maths, 16 different books of Science and 12 different books of Social Science to poor students. Each student is given maximum number of books of only one subject of their interest and each student got equal number of books.

(a) Find the number of books each student got.

(b) Find the total number of students who got books.

A.
a	b
4	14

B.
a	b
3	10

C.
a	b
4	10

D.
a	b
3	15

Answer: A

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7. Read the following statements carefully and state 'T' for true and 'F' for false.

(i) $\dfrac{501}{25}$ is a terminating decimal.

(ii) $\dfrac{621}{125}$ is a non-terminating decimal.

(iii) $\dfrac{6805}{27 \times 5^2}$ is a non-terminating decimal.

(iv) $\dfrac{7105}{7 \times 5^2}$ is a terminating decimal.

A.

i	ii	iii	iv
F	T	T	F

B.

i	ii	iii	iv
T	F	T	T

C.

i	ii	iii	iv
T	T	F	F

D.

i	ii	iii	iv
F	T	F	T

Answer: B

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