MATHS

BOOKS - HT Olympiad Previous Year Paper

POLYNOMIALS

Mathematical Reasoning

1. The value of k for which $(x-1)$ is a factor of $9x^2+kx-18$ is ____

A. 9

B. 5

C. -9

D. 0

Answer: A

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2. The remainder when $x^4 - y^4$ is divided by x-y is :

A. 0

B. $x + y$

C. $x^2 - y^2$

D. $2y^4$

Answer: A

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3. If $x^{21} + 101$ is divided by x+1 then the remainder is

A. -1

B. 102

C. 0

D. 100

Answer: D

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4. If $x = \frac{a-b}{a+b}, y = \frac{b-c}{b+c}, z = \frac{c-a}{c+a}$,then the value of $\frac{(1+x)(1+y)(1+z)}{(1-x)(1-y)(1-z)}$ is

A. abc

B. $a^2b^2c^2$

C. 1

D. -1

Answer: C

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5. if $(x+2)$ and $(x-1)$ are the factors of $\left(x^3 + 10x^2 + mx + n\right)$, then the values of m and n

are:-

A. $-5, 5$

B. $7, 18$

C. $7, \ -18$

D. $-5, \ -18$

Answer: C

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6. Given that $x = -4$ is a solution of $x^3 - x^2 - 14x + 24 = 0$. The other solutions are _____.

A. 1,3

B. 2,3

C. 1,4

D. 2,5

Answer: B

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7. The product $(a+b)(a-b)\left(a^2-ab+b^2\right)\left(a^2+ab+b^2\right)$ is equal to: a^6+b^6 (b) a^6-b^6 (c) a^3-b^3 (d) a^3+b^3

A. a^6+b^6

B. $a^6 - b^6$

C. $a^3 - b^3$

D. $a^3 + b^3$

Answer: B

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8. Find the value of $(x-a)^3 + (x-b)^3 + (x-c)^3 - 3(x-a)(x-b)(x-c)$ when $a + b + c = 3x$

A. 3

B. 2

C. 1

D. 0

Answer: D

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9. Value of R if

$$\frac{a^2 - 19a - 25}{a - 7} = a - 12 + \frac{R}{a - 7}$$ is _____.

A. -109

B. -88

C. -84

D. -64

Answer: A

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10. When $\left(x^3 - 2x^2 + px - q\right)$ is divided by $\left(x^2 - 2x - 3\right)$ the remainder is (x-6)The values of p and q are:

A. $-2, \ -6$

B. $2, \ -6$

C. $-2, 6$

D. $2, 6$

Answer: C

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11. Find the remainder when the expression $x^3 + x^2 + x + 1$ is divided by $x + 1$.

A. 3

B. 5

C. 2

D. 0

Answer: D

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12. If $x^2 - 1$ is a factor of $ax^4 + bx^3 + cx^2 + dx + e$, show that $a + c + e = b + d = 0$

A. $a + b + d = c + d$

B. $a + b + c = d + e$

C. $b + c + d = a + e$

D. None of these

Answer: D

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13. If a, b, c are all non zero and $a + b + c = 0$, prove that

$$\frac{a^2}{bc}+\frac{b^2}{ca}+\frac{c^2}{ab}=3.$$

A. 0

B. 1

C. 2

D. 3

Answer: D

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14. A rectangular field has a area $\left(14x^2-11x-15\right)m^2$. What could be the possible expression for length and breadth of the field?

A. $(3x-2)m$ and $(5x+8)m$

B. $(7x+5)m$ and $(2x-3)m$

C. Both A and B

D. None of these

Answer: B

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15. Area of a rectangular field is $\left(2x^3-11x^2-4x+5\right)$ sq. units and side of a square field is $\left(2x^2+4\right)$ units. Find the difference between their areas (in sq. units)

A. $4x^4-2x^3-27x^2-4x+11$

B. $4x^4 - 2x^3 + 27x^2 + 4x + 11$

C. $4x^4 + 27x^2 + 4x - 11$

D. $4x^4 + 2x^3 + 27x^2 + 4x + 11$

Answer: B

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16. Vikas has Rs. $\left(x^3 + 2ax + b\right)$, with this money he can buy exactly (x-1) jeans or (x+1) shirts with no money left. How much money Vikas has if x=4?

A. Rs. 80

B. Rs. 120

C. Rs. 30

D. Rs. 60

Answer: D

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Everyday Mathematics

1. Length, breadth and height of a cuboidal tank are $(2x - y)m$, $(2x + y)m$ and $\left(4x^2 + y^2\right)m$ respectively. Find the volume of the tank.

A. $\left(4x^3 + 12xy + y^3\right)m^3$

B. $\left(4x^4+12x^2y^2+y^2\right)m^3$

C. $\left(16x^4-y^4\right)m^3$

D. $\left(16x^4+y^4\right)m^3$

Answer: C

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Achievers Section Hots

1. If $\left(5x^2+14x+2\right)^2-\left(4x^2-5x+7\right)^2$ is divided by x^2+x+1, then what is the remainder?

A. $\left(x^2+19x-5\right), 0$

B. $9\left(x^2+19x-6\right), 0$

C. $\left(x^2+19x-5\right), 1$

D. $9(x+19x-5), 1$

Answer: B

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2. Selec the CORRECT statement.

A. If $x=\frac{\sqrt{3}+1}{\sqrt{3}-1}+\frac{\sqrt{3}-1}{\sqrt{3}+1}+\frac{\sqrt{3}-2}{\sqrt{3}+2}$, then the value of $x^2+\left(\frac{39}{x}\right)^2$ is 110.

B. Every integer is a whole number

C. Between two rational numbers there exists infinite number of integers.

D. None of these

Answer: D

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3. Study the given statements carefully.

Statement I:

$$\frac{\left(a^2-b^2\right)^3+\left(b^2-c^2\right)^3+\left(c^2-a^2\right)^3}{(a+b)^3+(b+c)^3+(c+a)^3}$$
$$=(a+b)(b+c)(c+a)$$

Statement II $a^2+b^2+c^2-ab-bc-ca$

$$= \frac{1}{2}\left[(a-b)^2 + (b-c)^2 + (c-a)^2\right]$$

Which of the following options holds?

A. Both Statement I and Statement II are true.

B. Statement I is true but Statement II is false

C. Statement I is false but Statement II is true.

D. Both Statement I and Statement II are false.

Answer: C

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