MATHS

BOOKS - HT Olympiad Previous Year Paper

POLYNOMIALS

Mathematical Reasoning

1. $px^3 + qx^2 + rx + s$ is said to be a cubic polynomial, if ___.

A. $s \neq 0$

B. $r \neq 0$

C. $q \neq 0$

D. $p \neq 0$

Answer: D

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2. If sum of all zeros of the polynomial $5x^2$- (3 + k) x + 7 is zero, then zeroes of the polynomial $2x^2$ - 2(k + 11)x + 30 are

A. 3,5

B. 7,9

C. 3,6

D. 2,5

Answer: A

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3. If the sum of the product of the zeroes taken two at a time of the polynomial f(x) =

$2x^3 - 3x^2$ + 4tx - 5 is -8, then the value of t is_____.

A. 2

B. 4

C. -2

D. -4

Answer: D

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4. If α, β are zeroes of the polynomial f(x) = ax^2 + bx + c, the c, then $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$ =

A. $\frac{b^2 - 2ac}{a^2}$

B. $\frac{b^2 - 2ac}{c^2}$

C. $\frac{b^2 + 2ac}{a^2}$

D. $\frac{b^2 + 2ac}{c^2}$

Answer: B

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5. A cubic polynomial with sum of its zeroes, sum of the product of its zeroes taken two at a time and the product of its zeroes as -3, 8, 4 respectively, is_____.

A. $x^3 - 3x^2 - 8x - 4$

B. $x^3 + 3x^2 - 8x - 4$

C. $x^3 + 3x^2 + 8x - 4$

D. $x^3 - 3x^2 - 8x + 4$

Answer: C

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6. If p, q are the zeroes of the polynomial f(x) = x^2 + k(x - 1) - c, then (p - 1)(q- 1) is equal to _____.

A. c-1

B. 1 -c

C. c

D. 1 +c

Answer: B

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7. When $x^3 - 3x^2 + 3x + 5$ is divided by x^2 - x + 1, the quotient and remainder are

A. $x + 2, 7$

B. x-2 , -7

C. x- 2 , 7

D. x + 2 , -7

Answer: C

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8. What should be subtracted from f(x) = $6x^3 + 11x^2 - 39x - 65$ so that f(x) is exactly divisible by $x^2 + x - 1$?

A. 38 x + 60

B. $-38 - 60$

C. $-19x - 30$

D. $9x + 10$

Answer: B

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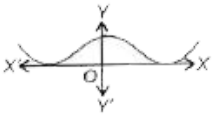
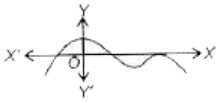
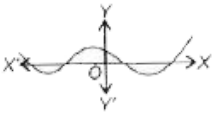
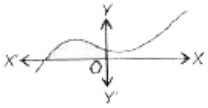
9. Which of the following graph has more than three distinct real roots?

A. 

B. 

C. 

D. 

Answer: C

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10. If one root of the polynomial f(x) = $3x^2$ + 11x + p is reciprocal of the other, then the value of p is

A. 0

B. 3

C. $\frac{1}{3}$

D. -3

Answer: B

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11. A polynomial of the form $ax^5 + bx^3 + cx^2 + dx + e$ has atmost _____ zeroes.

A. 3

B. 5

C. 7

D. 11

Answer: B

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Everyday Mathematics

1. For $x^2 + 2x + 5$ to be a factor of $x^4 + \alpha x^2 + \beta$ the values of $\alpha$and β respectively are

A. 2,5

B. 5,25

C. 6,25

D. 5,2

Answer: C

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2. Akshay's father has given him money to buy some apples from the market at the rate of $x^2 - 5x + 6$ per apple. The total amount of money given by his father is represented by $4x^4 + 2x^3 - 2x^2 + x - 1$. Find the maximum amount of money he should have so that he is able to buy exact number of apples from the market.

A. $4x^4 + 2x^3 - 2x^2 + 288x + 504$

B. $4x^4 + 2x^3 - 2x^2 - 288x - 504$

C. $4x^4 + 2x^3 - 2x^2 - 288x + 504$

D. None of these

Answer: C

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3. A rectangular garden of length $(2x^3 + 5x^2 - 7)$ m has the perimeter

$(4x^3 - 2x^2 + 4)$ m. Find the breadth of the garden.

A. $(6x^2 - 9)$m

B. $(-6x^2 + 9)$ m

C. $(2x^3 - 7x^2 + 11)m$

D. $(6x^3 + 7x^2 + 9)$ m

Answer: B

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4. Raghav had ₹ $\left(6x^3+2x^2+3x\right)$ and he bought $\left(4x^2+3\right)$ shirts. The price of each shirt is ₹ (x + 5). How much money is left with Raghav?

A. ₹$\left(2x^3-18x^2-15\right)$

B. ₹$\left(4x^2+2x+3\right)$

C. ₹$\left(x^3-3x\right)$

D. ₹$\left(2x^3+2x^2-15\right)$

Answer: A

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5. Two different container contains $\left(2x^3+2x^2+3x+3\right)$ L and $\left(4x^3-2x^2+6x-3\right)$ L water, What is biggest measure that can measure both quantities exactly?

A. $\left(x^2 2x\right)L$

B. $\left(2x^2+3\right)L$

C. $(2x-1)L$

D. $(x+1)L$

Answer: B

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6. Length and breadth of a rectangular park are $(3x^2 + 2x)$ m and $(2x^3 - 3)$ m respectively. Find the area of the park, when x = 3.

A. $1924m^2$

B. $1492m^2$

C. $1881m^2$

D. $1683m^2$

Answer: D

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Achievers Section Hots

1. Which of the following options hold?

Statement - I : If p(x) and g(x) are two polynomials with g(x) $\neq$ 0, then we can find polynomials q(x) and r(x) such that p(x) = g(x)

$\times$ q(x) + r(x), where degree of r(x) is greater than degree of g(x).

Statement - II : When $4x^5 + 3x^3 + 2x^2 + 8$ is divided by $4x^2 + 2x + 1$, then degree of remainder is 1. Read the given statements carefully

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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2. Obtain all the zeros of the polynomial $f(x) = 3x^4 + 6x^3 - 2x^2 - 10x - 5$, if two

of its zeros are $\sqrt{and} - \sqrt{\frac{5}{3}}$

A. 1,-1

B. 1,1

C. $-1, \ -1$

D. $1, 0$

Answer: C

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3. Match the following.

	Column - I		Column - II
(P)	If one of the zero of the polynomial $f(x) = (k^2 + 4)x^2 + 13x + 4$ is reciprocal of the other, then k is equal to	(i)	1
(Q)	If sum of the zeroes of the polynomial $f(x) = 2x^3 + kx^2 + 4x + 5$ is 3, then k is equal to	(ii)	0
(R)	If the polynomial $f(x) = ax^3 + bx - c$ is exactly divisible by $g(x) = x^2 + bx + c$, then ab is equal to	(iii)	-6

A. $(P) \rightarrow (iii), (Q) \rightarrow (i), (R) \rightarrow (ii)$

B. $(P) \rightarrow (ii), (Q) \rightarrow (iii), (R) \rightarrow (i)$

C. $(P) \rightarrow (ii), (Q) \rightarrow (iii), (R) \rightarrow (i)$

D. $(P) \rightarrow (ii), (Q) \rightarrow (i), (R) \rightarrow (iii)$

Answer: B

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