Chapter 9

Polynomials

Concept : Factors of a polynomial

Q.9.1 Find the remainder on dividing the polynomial $x^3 - 3x^2 - x - 3$ by $x - 2$. What number added to $x^3 - 3x^2 - x - 3$ gives a polynomial for which $x - 2$ is a factor?

Score : 4, Time : 7 minutes

Concept : Factors of a polynomial

Q.9.2 Check whether $x + 2$ and $x + 3$ are factors of $x^2 + 5x + 6$

Score : 2, Time : 4 minutes

Concept : Factors of a polynomial

Q.9.3 Find the remainder on dividing $ax^2 + bx + c$ by $x - 1$. If $x - 1$ is a factor of this polynomial, what is the relation between a, b, c?

Score : 3, Time : 5 minutes

Concept : Factors of a polynomial

Q.9.4 Show that if $b = a + c$, then $x + 1$ is a factor of $ax^2 + bx + c$. Write down a polynomial for which $x + 1$ is a factor.

Score : 3, Time : 5 minutes

Concept : Factors of a polynomial

Q.9.5 Prove that $x - 1$ and $x + 1$ are factors of $3x^3 - 2x^2 - 3x + 2$. If $3x^3 - 2x^2 - 3x + 2 = (x^2 - 1)(ax + b)$, what are a and b?

Score : 5, Time : 8 minutes

Concept : Factors of a polynomial

Q.9.6 $x - 1$ and $x + 1$ are factors of $ax^3 + bx^2 + cx + d$

    (i) Prove that $a = -c$ and $b = -d$

    (ii) Write down a polynomial for which $x - 1$ and $x + 1$ are factors

Score : 5, Time : 8 minutes

Concept : Factorization of polynomials

Q.9.7 Write $x^2 - 7x - 60$ as the product of two first degree polynomials

Score : 3, Time : 5 minutes

Concept : Factorization of polynomials

Q.9.8 Prove that in the polynomial $p(x) = x^2 + 3x + k$

    (i) if $k = -4$, then it has factors

    (ii) if $k = 4$, then it has no factors

Score : 4, Time : 8 minutes

Concept : Factorization of polynomials

Q.9.9 Write $x^2 - x - 1$ as the product of two first degree polynomials

Score : 4, Time : 6 minutes

Concept : Factorization of polynomials

Q.9.10 If $x - 1$ and $x - 2$ are factors of $x^3 - 6x^2 - ax + b$, what are a and b?

Score : 5, Time : 8 minutes

Concept : Factorization of polynomials

Q.9.11 Find the remainders on dividing $x^3 + 6x^2 + 11x - 6$ by $x + 1$ and $x + 2$. If $x + 1$ and $x + 2$ are factors of $x^3 + 6x^2 + 11x - 6 + k$, then what is k?

Score : 5, Time : 8 minutes

Concept : Factorization of polynomials

Q.9.12 Which number added to the polynomial $2x^2 - 3x - 1$ gives a polynomial with $x - 1$ as a factor?

Concept : Factorization of polynomials

Q.9.13 Write down a second degree polynomial with the coefficient of x^2 as 1. Check whether $x - 1$ is a factor of this polynomial

Score : 3, Time : 5 minutes

Concept : Factorization of polynomials

Q.9.14 The solutions of $x^2 + ax + b = 0$ are -3 and 5

   (i) Write $x^2 + ax + b$ as the product of two first degree polynomials

   (ii) What are a and b?

Score : 3, Time : 5 minutes

Concept : Factors of polynomials

Q.9.15   (i) Find the remainder on dividing $p(x) = x^2 - 7x + 5$ by $x - 2$

   (ii) Find the remainder on dividing $q(x) = x^2 - 5x + 7$ by $x - 2$

   (iii) Find the remainder on dividing $p(x) + q(x)$ by $x - 2$

Score : 4, Time : 6 minutes

Concept : Factors of polynomials

Q.9.16 The remainder on dividing the polynomial $p(x)$ by $x - a$ is k and the remainder on diving the polynomial $q(x)$ by $x - a$ is $-k$. Prove that $x - a$ is a factor of $p(x) + q(x)$

Score : 4, Time : 6 minutes

Concept : Factors of polynomials

Q.9.17 If $x - 1$ is to be a factor of $x^3 - kx^2 - x + 2$, what should be k?

Score : 2, Time : 4 minutes

Concept : Factors of polynomials

Q.9.18 Check whether $2x + 3$ is a factor of $2x^3 + 3x^2 + 4x + 7$. Write down a third degree polynomial for which $2x + 3$ is a factor

Score : 3, Time : 4 minutes

Concept : Factors of polynomials

Q.9.19 Check whether $x - 1$ is a factor of $ax^3 + bx^2 - ax - b$. Write down a polynomial for which $x - 1$ is a factor

Score : 3, Time : 4 minutes

Concept : Factors of polynomials

Q.9.20 Which first degree polynomial added to $5x^3 + 3x^2$ gives a polynomial for which $x^2 - 1$ is a factor?

Score : 5, Time : 8 minutes

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