

Class 10 Maths - Chapter 2: Polynomials

Polynomials Class 10 Maths NCERT Solutions

NCERT Solutions for Class 10 Maths Chapter 2 Polynomials are part of NCERT Solutions for Class 10 Maths. Here we have given Maths NCERT Solutions Class 10 Chapter 2 Polynomials.

Class 10 Maths NCERT Solutions Chapter 2 Polynomials Ex 2.1

Question 1:

The graphs of $y = p(x)$ are given below for some polynomials $p(x)$. Find the number of zeroes of $p(x)$ in each case.

NCERT Solutions for Class 10 Maths Chapter 2 Polynomials Ex 2.1 Q1

Polynomials Ex 2.1 NCERT Solutions for Class 10 Maths Chapter 2

Polynomials Exercise 2.1 NCERT Solutions for Class 10 Maths Chapter 2

Solution:

NCERT Solutions for Class 10 Maths Chapter 2 Polynomials Ex 2.1 Q1

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Class 10 Maths NCERT Solutions Chapter 2 Polynomials Ex 2.2

Question 1.

Find the zeroes of the following quadratic polynomials and verify the relationship between the zeroes and their coefficients:

(i) $x^2 - 2x - 8$

(ii) $4s^2 - 4s + 1$

(iii) $6x^2 - 3 - 7x$

(iv) $4u^2 + 8u$

(v) $t^2 - 15$

(vi) $3x^2 - x - 4$

Solution:

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Question 2.

Find a quadratic polynomial each with the given numbers as the sum and product of zeroes respectively:

Polynomials Ex 2.2 NCERT Solutions for Class 10 Maths Q2

Solution:

Polynomials Class 10 Chapter 2 NCERT Solutions Ex 2.2 Q2

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Class 10 Maths NCERT Solutions Chapter 2 Polynomials Ex 2.3

Question 1.

Divide the polynomial $p(x)$ by the polynomial $g(x)$ and find the quotient and remainder in each of the following:

(i) $p(x) = x^3 - 3x^2 + 5x - 3$, $g(x) = x^2 - 2$

(ii) $p(x) = x^4 - 3x^2 + 4x + 5$, $g(x) = x^2 + 1 - x$

(iii) $p(x) = x^4 - 5x + 6$, $g(x) = 2 - x^2$

Solution:

NCERT Solutions for Class 10 Maths Chapter 2 Polynomials Ex 2.3 Q1

Question 2.

Check whether the first polynomial is a factor of the second polynomial by dividing the second polynomial by the first polynomial.

(i) $t^2 - 3$, $2t^4 + 3t^3 - 2t^2 - 9t - 12$

(ii) $x^2 + 3x + 1$, $3x^4 + 5x^3 - 7x^2 + 2x + 2$

(iii) $x^2 + 3x + 1$, $x^5 - 4x^3 + x^2 + 3x + 1$

Solution:

Polynomials class 10 Ex 2.3 Maths NCERT Solutions Q2

Question 3.

Obtain all other zeroes of $3x^4 + 6x^3 - 2x^2 - 10x - 5$, if two of its zeroes are $\sqrt{5}$ and $-\sqrt{5}$

Solution:

Polynomials Class 10 Chapter 2 Maths NCERT Solutions Ex 2.3 Q3

Question 4.

On dividing $x^3 - 3x^2 + x + 2$ by a polynomial $g(x)$, the quotient and remainder were $x - 2$ and $-2x + 4$ respectively. Find $g(x)$.

Solution:

Polynomials NCERT Solutions for Class 10 Maths Chapter 2 Ex 2.3 Q4

Question 5.

Give examples of polynomials $p(x)$, $g(x)$, $q(x)$ and $r(x)$, which satisfy the division algorithm and:

(i) $\deg p(x) = \deg q(x)$

(ii) $\deg q(x) = \deg r(x)$

(iii) $\deg r(x) = 0$

Solution:

Polynomials Class 10 Maths NCERT Solutions Chapter 2 Ex 2.3 Q5

Class 10 Maths NCERT Solutions Chapter 2 Polynomials Ex 2.4

Question 1.

Verify that the numbers given alongside of the cubic polynomials below are their zeroes. Also, verify the relationship between the zeroes and the coefficients in each case:

(i) $2x^3 + x^2 - 5x + 2$; 14, 1, -2

(ii) $x^3 - 4x^2 + 5x - 2$; 2, 1, 1

Solution:

NCERT Solutions for Class 10 Maths Chapter 2 Polynomials Ex 2.4 Q1

Question 2.

Find a cubic polynomial with the sum, some of the product of its zeroes taken two at a time, and the product of its zeroes as 2, -7, -14 respectively.

Solution:

Polynomials Class 10 Maths NCERT Solutions Chapter 2 Ex 2.4 Q2

Question 3.

If the zeroes of the polynomial $x^3 - 3x^2 + x + 1$ are $a-b$, a , $a+b$, find a and b .

Solution:

Polynomials Class 10 Maths NCERT Solutions Exercise 2.4 Q3

Question 4.

If two zeroes of the polynomial $x^4 - 6x^3 - 26x^2 + 138x - 35$ are $2 \pm \sqrt{3}$, find other zeroes.

Solution:

Polynomials Exercise 2.4 Class 10 Maths NCERT Solutions Q4

Question 5.

If the polynomial $x^4 - 6x^3 + 16x^2 - 25x + 10$ is divided by another polynomial $x^2 - 2x + k$, the remainder comes out to be $x + a$, find k and a .

Solution:

Polynomials Ex 2.4 Class 10 Maths NCERT Solutions Q4

Class 10 Maths Polynomials Mind Map

Polynomial

An algebraic expression $f(x)$ of the form

$$f(x) = a_0 + a_1x + a_2x^2 + \dots + a_nx^n,$$

where $a_0, a_1, \dots, a_n$ are real numbers and all indices of variables are non-negative integers is called polynomial in variable x .

(i) The highest power of x is called degree of the polynomial.

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(ii) $a_0, a_1, \dots, a_n$ are terms of the polynomial.

(iii) $a_0, a_1, \dots, a_n$ are co-efficients of the polynomial.

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Standard Forms of Linear, Quadratic and Cubic Polynomials

(i) Linear Polynomial:

$ax + b$, where a, b are real numbers and $a \neq 0$.

(ii) Quadratic Polynomial:

$ax^2 + bx + c$, where a, b, c are real numbers & $a \neq 0$.

(iii) Cubic Polynomials:

$ax^3 + bx^2 + cx + d$, where a, b, c, d are real numbers and $a \neq 0$.

Value of a Polynomial

The value of a polynomial $f(x)$ at $x = a$ is obtained by substituting $x = a$ in the given polynomial and is denoted by $f(a)$.

Zero(es)/Root(s) of Polynomial

$x = r$ is a zero of a polynomial $p(x)$ if $p(r) = 0$.

Geometrical Meaning of Zeroes of a Polynomial

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Zero(es) of a polynomial is/are the x-coordinate of the point(s) where graph $y = \text{fix}$ intersects the x-axis.

(i) Linear polynomial: Graph of linear polynomial is a straight line and has exactly one zero.

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(ii) Quadratic polynomial: Graph of quadratic polynomial is always a parabola and this polynomial can have atmost two zeroes.

(iii) Cubic polynomial: Cubic polynomial can have atmost three zeroes.

Cases of Quadratic Polynomial

Case-I : If a quadratic polynomial $P(x) = ax^2 + bx + c$ has two zeroes, then its graph will intersect the x-axis at two distinct points A and B as shown in the figure.

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Case-II: If a quadratic polynomial $P(x) = ax^2 + bx + c$ has only one zero, then its graph will touch the x-axis at only one point A as shown in the figure.

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Case-III : If a quadratic polynomial $P(x) = ax^2 + bx + c$ has no zero, then its graph will not intersect /touch the x-axis at any point as shown in the figure.

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Relationship between Zeroes and Coefficients of a Polynomial

(i) Zero of a linear polynomial $ax + b$ is $x = -ba$

(ii) If α and β are the zeroes of the quadratic polynomial $ax^2 + bx + c$, then

$$\alpha + \beta = -ba$$

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(iii) If α , β and γ are zeroes of the cubic polynomial $ax^3 + bx^2 + cx + d$ then

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Division Algorithm

If $p(x)$ and $g(x)$ are any 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 either $r(x) = 0$ or degree of $r(x) < \text{degree of } g(x)$