NCERT Solutions Class 10 Maths
Chapter 2: Polynomials
EXERCISE 2.2

Quick Summary: In NCERT Solutions Class 10 Maths Chapter 2 Exercise 2.2, students learn the fundamental relationship between zeroes and coefficients of polynomials. This exercise covers essential formulas for finding sum and product of zeroes, along with the division algorithm for polynomials, which are crucial topics frequently tested in CBSE Class 10 board exams.

Key Takeaways:

- For a quadratic polynomial ax^2 + bx + c, sum of zeroes = -(b)/(a) and product of zeroes = (c)/(a)
- The division algorithm states that for polynomials p(x) and g(x), p(x) = g(x) × q(x) + r(x)
- Students can form quadratic polynomials when sum and product of zeroes are given using x^2 - (\textsum)x + (\textproduct) = 0
- These relationships help verify zeroes of polynomials and solve complex factorization problems in CBSE exams

Complete Solutions

Question 1

Find the zeroes of the following quadratic polynomials and verify the relationship between the zeroes and the 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

General relation between zeroes and coefficients

For a quadratic polynomial with zeroes and (), the following relations hold:

These will be verified in each case.

(i)

Consider the quadratic equation

Factorise the quadratic expression. We need two numbers whose product is and sum is . These numbers are and .

So,

Hence the zeroes are

Let and .

Sum of zeroes: .

Product of zeroes: .

For , .

Thus, and . Relation verified.

(ii)

Consider

Try to factorise:

So

Both zeroes are equal, .

Sum of zeroes:

Product of zeroes:

Here .

Again, the relation is verified.

(iii)

First write the polynomial in standard order of powers of :

Set it equal to zero:

Use the quadratic formula

Here .

Discriminant:

.

Therefore,

So the two zeroes are

Thus, and .

Sum:

Product:

Now

Thus, the relation is satisfied.

(iv)

Write the quadratic equation:

Factor out the common term:

So

Hence,

Let and .

Sum:

Product:

Here, .

The relation holds.

(v)

Consider

Move the constant term to the other side:

Taking square roots,

So the zeroes are and .

Sum:

Product:

In , we have .

Hence, the relation is verified.

(vi)

Set

Use the quadratic formula with .

Discriminant:

.

So,

Thus, the two zeroes are

Let , .

Sum:

Product:

Here .

Thus, the relationship between zeroes and coefficients is verified in every case.

Question 2

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

(i) $(1)/(4)$, -1

(ii) $\sqrt{2}$, $(1)/(3)$

(iii) 0, $\sqrt{5}$

(iv) 1, 1

(v) $-(1)/(4)$, $(1)/(4)$

(vi) 4, 1

SOLUTION

Method using sum and product of zeroes

Let a quadratic polynomial have zeroes and . Then

The standard quadratic polynomial whose zeroes are and is

Any non-zero scalar multiple of this polynomial represents the same pair of zeroes. The given first number is taken as the sum and the second as the product .

(i)

Start with

To eliminate fractions, multiply the entire polynomial by 4 (a non-zero constant):

So a convenient quadratic polynomial is

This has sum of zeroes and product .

(ii)

Take

Multiply through by 3 to clear denominator:

Thus one suitable polynomial is

Its sum of zeroes is and product is .

(iii)

Using the general form,

Here there is no need to multiply by any constant, so

is the required quadratic polynomial whose zeroes have sum 0 and product .

(iv)

The polynomial is

The sum of its zeroes is 1 and product is 1, as required.

(v)

First write

Multiply by 4 to remove fractions:

So one convenient polynomial is

This polynomial has sum of zeroes and product .

(vi)

From the formula,

So

is a quadratic polynomial whose zeroes have sum 4 and product 1.

Therefore, suitable quadratic polynomials for each pair are:

(i) , (ii) , (iii) , (iv) , (v) , (vi) .

📚 Relevant Resources

Explore more NCERT solutions (click links to visit):

Resource	Visit Link
NCERT Class 10 Maths All Chapters	
NCERT Class 10 Science Solutions	
NCERT Class 10 Social Science	
NCERT Class 10 English Solutions	

📖 Key Formulas

Important Formulas for Exercise 2.2

Formula / Concept	Description
Zero of a Polynomial	A real number 'k' is a zero of a polynomial p(x) if p(k) = 0.

Formula / Concept	Description
General Form of a Quadratic Polynomial	$ax^2 + bx + c$, where a, b, and c are real numbers and $a \neq 0$.
Relationship Between Zeroes and Coefficients of a Quadratic Polynomial	If α and β are the zeroes of the quadratic polynomial $ax^2 + bx + c$, then:
Sum of Zeroes	$\alpha + \beta = -\frac{b}{a} = -\frac{\text{Coefficient of } x}{\text{Coefficient of } x^2}$
Product of Zeroes	$\alpha \beta = \frac{c}{a} = \frac{\text{Constant term}}{\text{Coefficient of } x^2}$
To Form a Quadratic Polynomial with Given Zeroes	If α and β are the zeroes, the quadratic polynomial can be written as: $k[x^2 - (\alpha + \beta)x + \alpha\beta]$, where k is a non-zero constant.
General Form of a Cubic Polynomial	$ax^3 + bx^2 + cx + d$, where a, b, c, and d are real numbers and $a \neq 0$.
Relationship Between Zeroes and Coefficients of a Cubic Polynomial	If α, β, and γ are the zeroes of the cubic polynomial $ax^3 + bx^2 + cx + d$, then:
Sum of Zeroes (Cubic)	$\alpha + \beta + \gamma = -\frac{b}{a} = -\frac{\text{Coefficient of } x^2}{\text{Coefficient of } x^3}$
Sum of the Products of Zeroes Taken Two at a Time	$\alpha\beta + \beta\gamma + \gamma\alpha = \frac{c}{a} = \frac{\text{Coefficient of } x}{\text{Coefficient of } x^3}$
Product of Zeroes (Cubic)	$\alpha\beta\gamma = -\frac{d}{a} = -\frac{\text{Constant term}}{\text{Coefficient of } x^3}$
Division Algorithm for Polynomials	If p(x) and g(x) are any two polynomials with g(x) ≠ 0, then we can find polynomials q(x) and r(x) such that: p(x) = g(x) × q(x) + r(x), where r(x) = 0 or degree of r(x) < degree of g(x).

？ Top FAQs

Q1. How many questions are in NCERT Solutions Class 10 Maths Chapter 2 Polynomials Exercise 2.2 for CBSE board exam 2025-26?

Exercise 2.2 of NCERT Solutions for Class 10 Maths Chapter 2 Polynomials contains exactly 2 questions. These questions focus on the relationship between zeroes and coefficients of polynomials, which carries important weightage in CBSE Class 10 board exam 2025-26.

Q2. Where can I download free PDF of NCERT Solutions for Class 10 Maths Chapter 2 Polynomials Exercise 2.2 with step by step solutions?

You can download the free PDF of NCERT Solutions for Class 10 Maths Chapter 2 Polynomials Exercise 2.2 from the official NCERT website or trusted educational platforms. These PDFs include complete step by step solutions for all questions updated as per CBSE syllabus 2025-26.

Q3. How many marks does Polynomials Chapter 2 Exercise 2.2 carry in CBSE Class 10 Maths board exam 2025-26?

Polynomials (Chapter 2) is part of Unit II - Algebra which carries 20 marks in total in CBSE Class 10 board exam 2025-26. Exercise 2.2 specifically covers the relationship between zeroes and coefficients, contributing approximately 3-5 marks to the final examination.

Q4. Which is the most difficult question in Exercise 2.2 of NCERT Solutions Class 10 Maths Chapter 2 Polynomials for CBSE 2025-26?

Question 2 of Exercise 2.2 in NCERT Solutions Class 10 Maths Chapter 2 Polynomials is generally considered more challenging as it involves finding a quadratic polynomial given specific conditions about zeroes. This question requires thorough understanding of the relationship between zeroes and coefficients formula and step by step problem-solving approach.

Q5. What is the relationship between zeroes and coefficients in NCERT Solutions Class 10 Maths Chapter 2 Polynomials Exercise 2.2?

In NCERT Solutions Class 10 Maths Chapter 2 Polynomials Exercise 2.2, the relationship between zeroes and coefficients states that for a quadratic polynomial $ax^2 + bx + c$, the sum of zeroes equals $-b/a$ and the product of zeroes equals c/a. This fundamental concept is crucial for solving Exercise 2.2 questions and appears frequently in CBSE board exam 2025-26.

🏛️ More Exercises

Visit all exercises from Chapter 2:

EXERCISE 2.1 →

EXERCISE 2.2 ✓ →

🌐 **Complete Chapter: Class 10 Maths Ch 2: Polynomials →**