MATHS

NCERT - NCERT Maths(Tamil)

POLYNOMIALS

Examples

1. Find the number zeroes of the given polynomials. And also find their values.

$p(x) = 2x + 1$

2. Find the number zeroes of the given polynomials. And also find their values.

$$q(y) = y^2 - 1$$

3. Find the number zeroes of the given polynomials. And also find their values.

$$r(z) = z^3$$

4. Find the zeroes of the quadratic polynomial $x^2 + 7x + 10$, and verify the relationship between the zeroes and the coefficients.

5. Find the zeroes of the polynomial $x^2 - 3$ and verify the relationship between the zeroes and the coefficients.

6. Find the quadratic polynomial, whose sum and product of the zeroes are - 3 and 2, respectively.

7. Find the quadratic polynomial whose zeroes are 2 and $\dfrac{-1}{3}$

8. Verify whether 3, -1 and $-\dfrac{1}{3}$ are the zeroes of the cubic polynomial

$p(x) = 3x^3 - 5x^2 - 11x - 3$, and then verify the relationship between the zeroes and the coefficients.

9. Divide $2x^2 + 3x + 1$ by $x + 2$.

10. Divide $3x^3 + x^2 + 2x + 5$ by $1 + 2x + x^2$.

11. Divide $3x^2 - x^3 - 3x + 5$ by $x - 1 - x^2$, and verify the division algorithm.

12. Find all the zeroes of $2x^4 - 3x^3 - 3x^2 + 6x - 2$, if you know that two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$.

Do This

1. State which of the following are polynomials and which are not ? Give reasons.

$2x^3$

2. State which of the following are polynomials and which are not ? Give reasons.

$$\frac{1}{x} - 1(x \neq 0)$$

3. State which of the following are polynomials and which are not ? Give reasons.

$$4z^2 + \frac{1}{7}$$

4. State which of the following are polynomials and which are not ? Give reasons.

$$m^2 - \sqrt{2}m + 2$$

▶ **Watch Video Solution**

5. State which of the following are polynomials and which are not ? Give reasons.

$$p^{-2} + 1$$

▶ **Watch Video Solution**

6. If $p(x) = x^2 - 5x - 6$, then find the values of

$$p(1), p(2), p(3), p(0), p(-1), p(-2), p(-3)$$

.

7. If $p(m) = m^2 - 3m + 1$, then find the value of $p(1)$ and $p(-1)$.

8. Let $p(x) = x^2 - 4x + 3$. Find the value of $p(0), p(1), p(2), p(3)$ and obtain zeroes of the polynomial $p(x)$.

9. Check whether -3 and 3 are the zeroes of the polynomial $x^2 - 9$.

10. Draw the graph of (i) $y = 2x + 5$, (ii) $y = 2x - 5$, (iii) $y = 2x$ and find the point of intersection on X - axis Is the x-coordinate of these points also the zeroes of the polynomial ?

11. Find the zeroes of the quadratic polynomials given below. Find the sum and product of the zeroes and verify relationship

to the coeffcients of terms of terms in the polynomial.

$$p(x) = x^2 - x - 6$$

12. Find the zeroes of the quadratic polynomials given below. Find the sum and product of the zeroes and verify relationship to the coeffcients of terms of terms in the polynomial.

$$p(x) = x^2 - 4x + 3$$

13. Find the zeroes of the quadratic polynomials given below. Find the sum and product of the zeroes and verify relationship to the coeffcients of terms of terms in the polynomial.

$$p(x) = x^2 - 4$$

14. Find the zeroes of the quadratic polynomials given below. Find the sum and product of the zeroes and verify relationship to the coeffcients of terms of terms in the polynomial.

$$p(x) = x^2 + 2x + 1$$

▶ **Watch Video Solution**

Try This

1. Write 3 different quadratic, cubic and 2 linear polynomials with different number of terms.

▶ Watch Video Solution

2. Write the general form of a quadratic polynomial and cubic polynomial in variable x.

▶ Watch Video Solution

3. Write a general polynomial $q(z)$ of degree n with coefficients that are $b_0, b_1, b_2, \ldots b_n$,

What are the conditions on $b_0, b_1, b_2, \ldots b_n$?

4. Draw the graphs of (i) $y = x^2 - x - 6$ (ii) $y = 6 - x - x^2$ and find zeroes in each case.

What do you notice ?

5. Write three quadratic polynomials that have 2 zeroes each.

▶ **Watch Video Solution**

6. Write one quadratic polynomial that has one zero.

▶ **Watch Video Solution**

7. How will you verify if a quadratic polynomial

has only one zero ?

> ▶ **Watch Video Solution**

8. Write three quadratic polynomials that have

no zeroes.

> ▶ **Watch Video Solution**

9. Find the zeroes of cubic polynomials (i) $-x^3$

(ii) $x^2 - x^3$ (iii) $x^3 - 5x^2 + 6x$ without

drawing the graph of the polynomial.

▶ Watch Video Solution

10. Find a quadratic polynomial with zeroes

-2 and $\dfrac{1}{3}$.

▶ Watch Video Solution

11. What is the quadratic polynomial the sum of whose zeroes id $\dfrac{-3}{2}$ and the product of the zeroes is -1

Exercise 3 1

1. In $p(x) = 5x^7 - 6x^5 + 7x + 6$, what is the

(i) coefficient of x^5 (ii) degree of $p(x)$ (iii) consstant term.

2. State whether the following statement is true or false. Give reasons for your choice.

The degree of the polynomial $\sqrt{2}x^2 - 3x + 1$ is $\sqrt{2}$.

3. State whether the following statement is true or false. Give reasons for your choice.

The coefficient of x^2 in the polynomial $p(x) = 3x^3 - 4x^2 + 5x + 7$ is 2

4. State whether the following statement is true or false. Give reasons for your choice.

The degree of a constant term is zero.

5. State whether the following statement is true or false. Give reasons for your choice.

$\dfrac{1}{x^2 - 5x + 6}$ is a quadratic polynomial.

▶ **Watch Video Solution**

---

6. State whether the following statement is true or false. Give reasons for your choice.

The degree of a polynomial is one more than the number of terms in it.

▶ **Watch Video Solution**

7. If $p(t) = t^3 - 1$, find the values of $p(1), p(-1), p(0), p(2), p(-2)$.

8. Check whether -2 and 2 are the zeroes of the polynomial $x^4 - 16$.

9. Check whether 3 and -2 are the zeroes of the polynomial $p(x)$ when $p(x) = x^2 - x - 6$.

▶ Watch Video Solution

Exercise 3 2

1. Find the zeroes of the given polynomials.

$p(x) = 3x$

▶ Watch Video Solution

2. Find the zeroes of the given polynomials.

$$p(x) = x^2 + 5x + 6$$

> ▶ **Watch Video Solution**

3. Find the zeroes of the given polynomial.

$$p(x) = (x + 2)(x + 3)$$

> ▶ **Watch Video Solution**

4. Draw the graphs of the given polynomial and find the zeroes. Justify the answers.

$$p(x) = x^2 - x - 12$$

▶ Watch Video Solution

---

5. Draw the graphs of the given polynomial and find the zeroes. Justify the answers.

$$p(x) = x^2 - 6x + 9$$

▶ Watch Video Solution

6. Draw the graphs of the given polynomial and find the zeroes. Justify the answers.

$$p(x) = x^2 - 4x + 5$$

▶ **Watch Video Solution**

7. Draw the graphs of the given polynomial and find the zeroes. Justify the answers.

$$p(x) = x^2 - 4x + 5$$

▶ **Watch Video Solution**

8. Draw the graphs of the given polynomial and find the zeroes. Justify the answers.

$$p(x) = x^2 - 1$$

9. Why are $\dfrac{1}{4}$ and -1 zeroes of the polynomials $p(x) = 4x^2 + 3x - 1$?

Exercise 3 3

1. Find the zeroes of the following quadratic polynomials and verify relationship between the zeroes and the coefficients.

$$x^2 - 2x - 8$$

2. Find the zeroes of the following quadratic polynomials and verify relationship between the zeroes and the coefficients.

$$4s^2 - 4s + 1$$

3. Find the zeroes of the following quadratic polynomials and verify relationship between the zeroes and the coefficients.

$$6x^2 - 3 - 7x$$

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

the zeroes and the coefficients.

$$4u^2 + 8u$$

5. Find the zeroes of the following quadratic polynomials and verify relationship between the zeroes and the coefficients.

$$t^2 - 15$$

6. Find the zeroes of the following quadratic polynomials and verify relationship between the zeroes and the coefficients.

$$3x^2 - x - 4$$

7. Find the quadratic polynomial in each case, with the given numbers as the sum and product of its zeroes respectively.

$$\frac{1}{4}, \; -1$$

8. Find the quadratic polynomial in each case, with the given numbers as the sum and product of its zeroes respectively.

$\sqrt{2}, \ \dfrac{1}{3}$

9. Find the quadratic polynomial in each case, with the given numbers as the sum and

product of its zeroes respectively.

$0, \sqrt{5}$

10. Find the quadratic polynomial in each case, with the given numbers as the sum and product of its zeroes respectively.

1,1

11. Find the quadratic polynomial in each case, with the given numbers as the sum and product of its zeroes respectively.

$$-\frac{1}{4}, \frac{1}{4}$$

▶ **Watch Video Solution**

12. Find the quadratic polynomial in each case, with the given numbers as the sum and product of its zeroes respectively.

4,1

13. Find the quadratic polynomial, for the zeroes α, β given in each case.

$2, \; -1$

14. Find the quadratic polynomial, for the zeroes α, β given in each case.

$\sqrt{3}, \; -\sqrt{3}$

15. Verify that $1,\ -1$ and $+3$ are the zeroes of the cubic polynomial $x^2 - 3x^2 - x + 3$ and check the relationship between zeroes and the coefficients.

▶ **Watch Video Solution**

Exercise 3 4

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

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

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

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

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

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

4. Check in which case the first polynomial is a factor of the second polynomial by dividing

the second polynomial by the first polynomial :

$$t^2 - 3, \ 2t^4 + 3t^3 - 2t^2 - 9t - 12$$

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

$$x^2 + 3x + 1, \ 3x^4 + 5x^3 - 7x^2 + 2x + 2$$

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

$x^3 - 3x + 1, \; x^5 - 4x^3 + x^2 + 3x + 1$

> ▶ **Watch Video Solution**

---

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

> ▶ **Watch Video Solution**

8. 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 $g(x)$.

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

deg p(x) = deg q(x)

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

deg q(x) = deg r(x)

11. Give examples of polynomials $p(x), g(x), q(x)$ and $r(x)$, which satisfy the

division algorithm and

deg r(x) = 0

Optional Exercise For Extensive Learning

1. Verify that the number given alongside the cubic polynomials are their zeroes. Also verify relationship betweeen the zeroes and coefficients in each case.

$$2x^3 + x^2 - 5x + 2, \ \left(\frac{1}{2}, 1, \ -2 \right)$$

2. Verify that the number given alongside the cubic polynomials are their zeroes. Also verify relationship between the zeroes and coefficients in each case.

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

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

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

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

▶ Watch Video Solution

6. 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.

▶ Watch Video Solution