



MATHS

NCERT - NCERT Maths(KANNADA)

POLYNOMIALS

Examples

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

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



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

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



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

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



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



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



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



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



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8. Verify whether 3 , -1 and $-\frac{1}{3}$ 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.



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



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



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



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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 $-\sqrt{2}$.



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Do This

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

$$2x^3$$



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

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



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

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



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

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



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

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



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

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

.



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



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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 $p(x)$.



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



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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 ?



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

to the coefficients of terms of terms in the polynomial.

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



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

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



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

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



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

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



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Try This

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



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



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



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4. Write one quadratic polynomial that has one zero.



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5. How will you verify if a quadratic polynomial has only zero ?



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6. Write three quadratic polynomials that have no zeroes.



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7. 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.



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8. Find a quadratic polynomial with zeroes -2
and $\frac{1}{3}$.



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



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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)
constant term.



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2. State which of the following statements are true and which are false ? Give reasons for your choice.

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



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



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Exercise 3 2

1. Find the zeroes of the given polynomials.

$$p(x) = 3x$$



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2. Find the zeroes of the given polynomials.

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



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3. Find the zeroes of the given polynomials.

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



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4. Find the zeroes of the given polynomials.

$$p(x) = x^4 - 16$$



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

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



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



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

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

(ii) Find the zeroes of the following quadratic polynomials and verify the relationship between the zeroes and the coefficients.

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

(iii) Find the zeroes of the following quadratic polynomials and verify the relationship between the zeroes and the coefficients.

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

(iv) Find the zeroes of the following quadratic polynomials and verify the relationship between the zeroes and the coefficients.

$$4u^2 + 8u$$

(v) Find the zeroes of the following quadratic polynomials and verify the relationship between the zeroes and the coefficients.

$$t^2 - 15$$

(vi) Find the zeroes of the following quadratic polynomials and verify the relationship between the zeroes and the coefficients.

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



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4. (i) Find the zeroes of the following quadratic polynomials and verify the relationship between the zeroes and the coefficients.

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

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

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

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polynomials and verify the relationship between the zeroes and the coefficients.

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

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(vi) Find the zeroes of the following quadratic polynomials and verify the relationship between the zeroes and the coefficients.

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



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

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



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

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





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

4, 1



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Exercise 3 4

1. Divide $p(x)$ by $g(x)$ and find the quotient and remainder :

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



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

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



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

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



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

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



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5. Obtain all other zeroes of $3x^4 + 6x^3 - 2x^2 - 10x - 5$, if two of its zeroes are

$$\sqrt{\frac{5}{3}} \text{ and } -\sqrt{\frac{5}{3}}$$



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6. 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 $g(x)$.



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

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



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

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



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Optional Exercise For Extensive Learning

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



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2. 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 .



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