MATHS

NCERT - NCERT MATHEMATICS(HINGLISH)

POLYNOMIALS

Exercise 2 1

1. The graphs of $y = p(x)$ are given in Figure below, for some polynomials p(x). Find the

number of zeroes of p(x), in each case.

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Exercise 2 3

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

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

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

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

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3. Divide the polynomial p(x) by the polynomial g(x) and find the quotient and remainder in each of the following :$p(x) = x^4 - 5x + 6$, $g(x) = 2 - x^2$

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

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5. Give examples of polynomials p(x), g(x), g(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) $\deg r(x) = 0$

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

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

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

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

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

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

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

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Exercise 2 2

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

$t^2 - 15$

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

$4u^2 + 8u$

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

$6x^2 - 3 - 7x$

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6. Find the zeroes of the following quadratic polynomials and verify the relationship between the zeroes and the coefficients $4s^2 - 4s + 1$

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7. 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) $3x^2 - x - 4$

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

(i) 1, 1

(ii) $-\frac{1}{4}, \frac{1}{4}$

(iiii) $4, 1$

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

(i) $\frac{1}{4}, -1$

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

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

(iv) $1, 1$

(v) $-\frac{1}{4}, \frac{1}{4}$

(vi) $4, 1$

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Solved Examples

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

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2. Verify that $3,\ 1,\ -\frac{1}{3}$ 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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3. Find a quadratic polynomial, the sum and product of whose zeroes are -3 and 2, respectively.

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


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5. 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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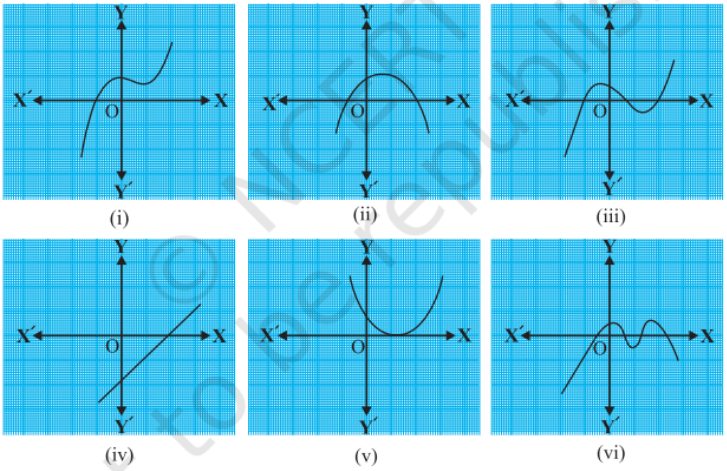
6. Look at the graphs in Figure given below. Each is the graph of $y = p(x)$, where p(x) is a polynomial. For each of the graphs, find the number of zeroes of p(x).



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

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

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Exercise 2 4

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

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

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

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4. 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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5. 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)

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

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

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