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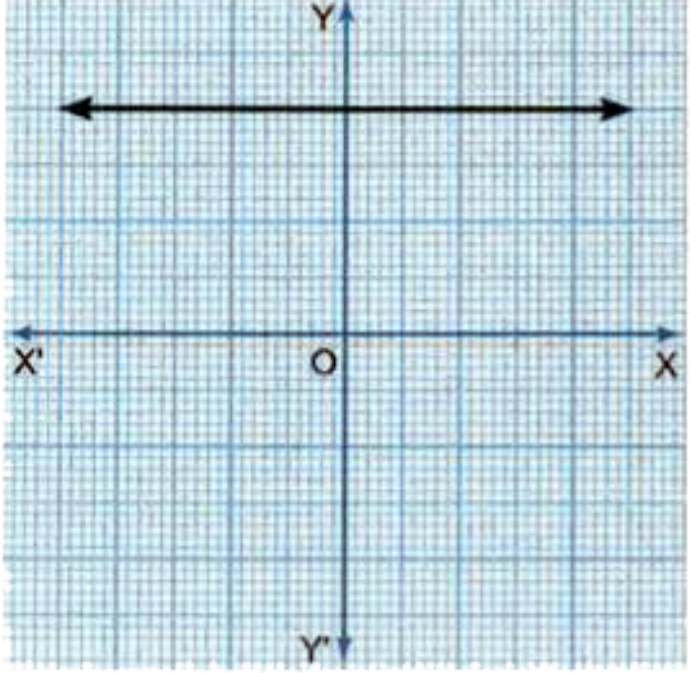
MATHS

BOOKS - VK GLOBAL PUBLICATION MATHS (HINGLISH)

POLYNOMIALS

Very Short Answer Questions

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



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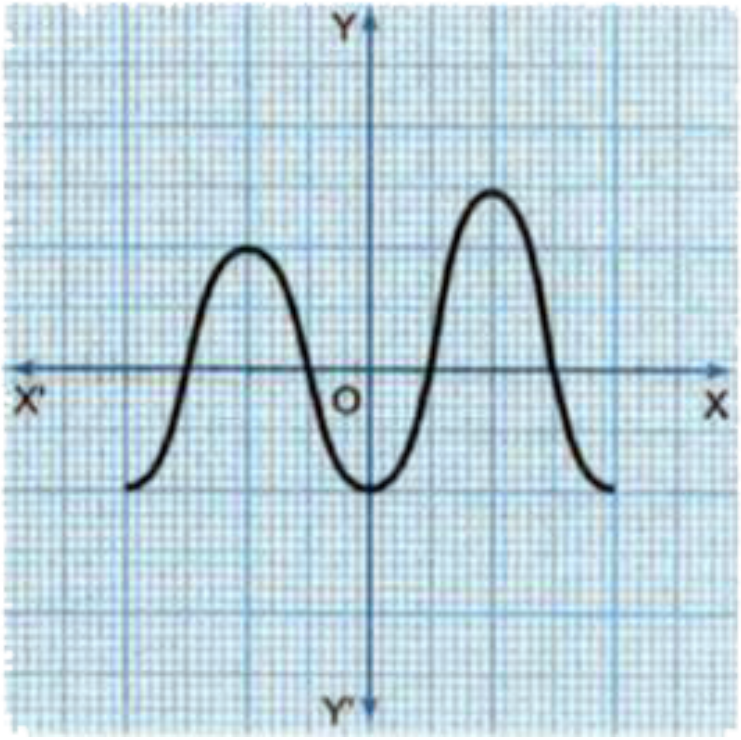
2. The graphs of y = p(x) for some polynomials are given below. Find the number of zeros in each case.



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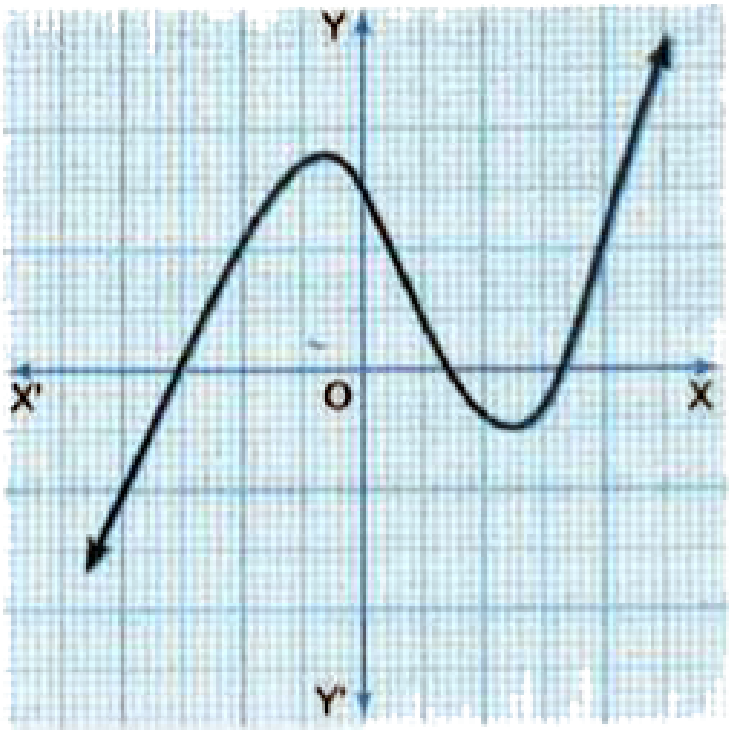
3. The graphs of y = p(x) for some polynomials are given below. Find the number of zeros in each case.



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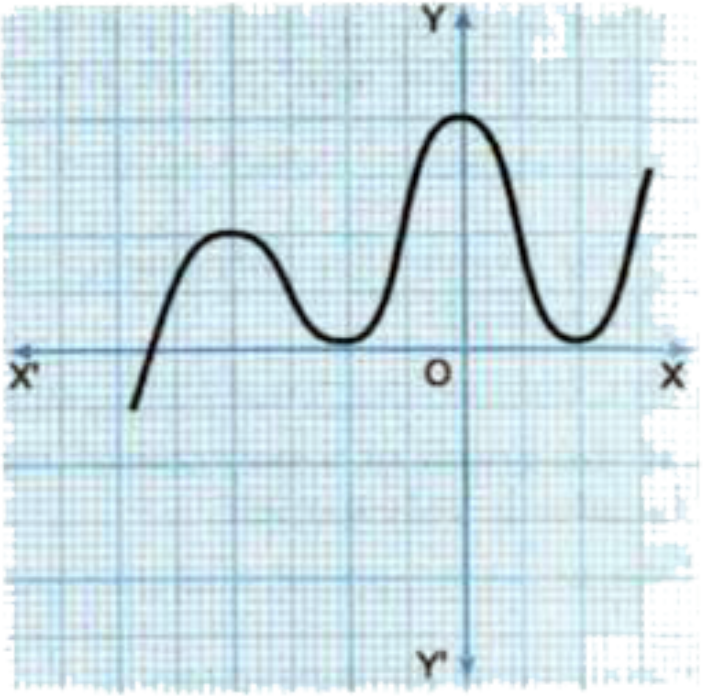
4. The graphs of y = p(x) for some polynomials are given below. Find the number of zeros in each case.



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5. What will the quotient and remainder be on division of

$ax^2 + bx + c$ by $px^5 + rx + 5, p \neq 0$

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6. If on division of a polynomial p(x) by a polynomial g(x), the quotient is zero, what is the relation between the degrees of p(x) and g(x)?

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7. Can $(x-2)$ be the remainder on division of a polynomial p(x) by $(x+3)$?

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8. Find the quadratic polynomial whose zeros are 3 and 4.

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9. If one zero of the quadratic polynomial $x^2 - 5x - 6$ is 6 then find the other zero

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10. If both the zeros of the quadratic polynomial $ax^2 + bx + c$ are equal and opposite in sign, then find the value of b.

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11. What should be added to the polynomial $x^2 - 5x + 4$, so that 3 is the zero of the resulting polynomial? (a) 1 (b) 2 (c) 4 (d) 5

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12. Can a quadratic polynomial $x^2 + kx + k$ have equal zeros for some odd integer $k > 1$?

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13. Are the following statements 'True' or 'False'? Justify your answer.

(i) If the zeroes of a quadratic polynomial $ax^2 + bx + c$ are both positive, then a,b and c all have the same sign.

(ii) If the graph of a polynomial intersects the X-axis at only one point, it cannot be a quadratic polynomial.

(iii) If the graph of a polynomial intersects the X-axis at

exactly two points, it need not ve a quadratic polynomial.

(iv) If two of the zeroes of a cubic polynomial are zero, then it does not have linear and constant terms.

(v) If all the zeroes of a cubic polynomial are negative, then all the coefficients and the constant term of the polynomial have the same sign.

(vi) If all three zeroes of a cubic polynomial $x^3 + ax^2 - bx + c$ are positive, then atleast one of a,b and c is non-negative.

(vii) The only value of k for which the quadratic polynomial $kx^2 + x + k$ has equal zeroes is $\frac{1}{2}$.

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14. Are the following statements 'True' or 'False'? Justify your answer.

(i) If the zeroes of a quadratic polynomial $ax^2 + bx + c$ are both positive, then a,b and c all have the same sign.

(ii) If the graph of a polynomial intersects the X-axis at only one point, it cannot be a quadratic polynomial.

(iii) If the graph of a polynomial intersects the X-axis at exactly two points, it need not ve a quadratic polynomial.

(iv) If two of the zeroes of a cubic polynomial are zero, then it does not have linear and constant terms.

(v) If all the zeroes of a cubic polynomial are negative, then all the coefficients and the constant term of the polynomial have the same sign.

(vi) If all three zeroes of a cubic polynomial $x^3 + ax^2 - bx + c$ are positive, then atleast one of a,b

and c is non-negative.

(vii) The only value of k for which the quadratic polynomial $kx^2 + x + k$ has equal zeroes is $\frac{1}{2}$.

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15. Are the following statements 'True' or 'False'? Justify your answer.

(i) If the zeroes of a quadratic polynomial $ax^2 + bx + c$ are both positive, then a,b and c all have the same sign.

(ii) If the graph of a polynomial intersects the X-axis at only one point, it cannot be a quadratic polynomial.

(iii) If the graph of a polynomial intersects the X-axis at exactly two points, it need not ve a quadratic polynomial.

(iv) If two of the zeroes of a cubic polynomial are zero,

then it does not have linear and constant terms.

(v) If all the zeroes of a cubic polynomial are negative, then all the coefficients and the constant term of the polynomial have the same sign.

(vi) If all three zeroes of a cubic polynomial $x^3 + ax^2 - bx + c$ are positive, then atleast one of a,b and c is non-negative.

(vii) The only value of k for which the quadratic polynomial $kx^2 + x + k$ has equal zeroes is $\frac{1}{2}$.

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Short Answer Questions I

1. If one of the zeros of the quadratic polynomial f(x) = $4x^2 - 8kx - 9$ is equal in magnitude but opposite in sign of the other, find the value of k.

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2. Q. If one zero of the quadratic polynomial $(k-1)x^2 + kx + 1$ is-3, then find the value of K

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3. If 1 is a zero of the polynomial $p(x) = ax^2 - 3(a-1)x - 1$, then find the value of a.

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4. If α and β are zeroes of polynomial $p(x) = x^2 - 5x + 6$, then find the value of $\alpha + \beta - 3\alpha\beta$

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5. Find the zeroes of the polynomial $p(x) = 4x^2 - 12x + 9.$

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6. If one root of $5x^2 + 13x + k = 0$ be the reciprocal of the other root then the value of k is

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7. If α and β are the zeroes of the polynomial $x^2 + x + 1$, then $\frac{1}{\alpha} + \frac{1}{\beta}$=

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8. If one of the zeroes of the cubic polynomial $ax^3 + bx^2 + cx + d$ is zero, the product of then other two zeroes is

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9. If the product of two zeros of the polynomial $f(x) = 2x^3 + 6x^2 - 4x + 9$ is , then its third zero is (a) $\frac{3}{2}$ (b) $-\frac{3}{2}$ (c) $\frac{9}{2}$ (d) $-\frac{9}{2}$

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

(i) $-\frac{1}{4}, \frac{1}{4}$, (ii) $\sqrt{2}, \frac{1}{3}$

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Short Answer Questions Ii

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

the first polynomial:

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

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

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4. If α and β are the zeros of the quadratic polynomial $f(x) = 2x^2 - 5x + 7$, find a polynomial whose zeros are $2\alpha + 3\beta$ and $3\alpha + 2\beta$.

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5. What must be subtracted from $8x^4 + 14x^3 - 2x^2 + 7x - 8$ so that the resulting polynomial is exactly divisible by $4x^2 + 3x - 2$.

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6. What must be added to $f(x) = 4x^4 + 2x^3 - 2x^2 + x - 1$ so that the resulting polynomial is divisible by $g(x) = x^2 + 2x - 3$.

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7. Obtain the zeros of the quadratic polynomial $\sqrt{3}x^2 - 8x + 4\sqrt{3}$ and verify the relation between its zeros and coefficients.

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8. If α and β are zeroes of the polynomial $6y^2-7y+2$, find the quadratic polynomial whose zeroes are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$

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9. If one zero of a polynomial $3x^2-8x+2k+1=0$ is seven times the other then k = ...

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10. One zero of the polynomial $2x^2+3x+kis\frac{1}{2}$ then k = ...

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11. If one zero of the polynomial $\left(a^2+9\right)x^2+13x+6a$ is reciprocal of the other, find the value of a.

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12. If the polynomial $\left(x^4+2x^3+8x^2+12x+18\right)$ is divided by another polymial $\left(x^2+5\right)$, the remainder comes out to be $(px+q)$. Find the values of p and q.

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Long Answer Questions 4 Marks

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) $2x^3 + x^2 - 5x + 2; \frac{1}{2}, 1, -2$ (ii) $x^3 - 4x^2 + 5x - 2;$ `2,\ 1,\

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

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3. Find the zeros of the polynomial $f(x) = x^3 - 5x^2 - 2x + 24$, if it is given that the product of its two zeros is 12.

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4. If the remainder on division of$x^3 - kx^2 + 13x - 21$ by -21 . find the quotient and the value of k. Hence, find the zeros of the cubic polynomial $x^3 - kx^2 + 13x$.

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

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6. If $\sqrt{2}$ is a zero of $p(x) = 6x^3 + \sqrt{2}x^2 - 10x - 4\sqrt{2}$, find the remaining zeros

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Hots Higher Order Thinking Skills

1. If α, β, γ are zeroes of polynomial $6x^3 + 3x^2 - 5x + 1$, then find the value of $\alpha^{-1} + \beta^{-1} + \gamma^{-1}$.

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2. Find the zeros of the polynomial $f(x) = x^3 - 12x^2 + 39x - 28$, if it is given that the zeros are in A.P.

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3. If the polynomial $f(x) = x^4 - 6x^3 + 16x^2 - 25x + 10$ 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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Proficiency Exercise Very Short Answer Questions

1. If one zero of the quadratic polynomial $x^2 + x - 2$ is -2, find the other zero.

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2. Find the other zero of the quadratic polynomial $y^2 + 7y - 60$ if one zero is -12

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3. Find the quadratic polynomial whose zeros are - 3 and -5.

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4. Find the quadratic polynomial whose zeros are 2 and -6.verify the relation between the coefficients and the zeros of the polynomial.

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5. What number should be added to the polynomial $x^2 + 7x - 35$ so that 3 is the zero of the polynomial?

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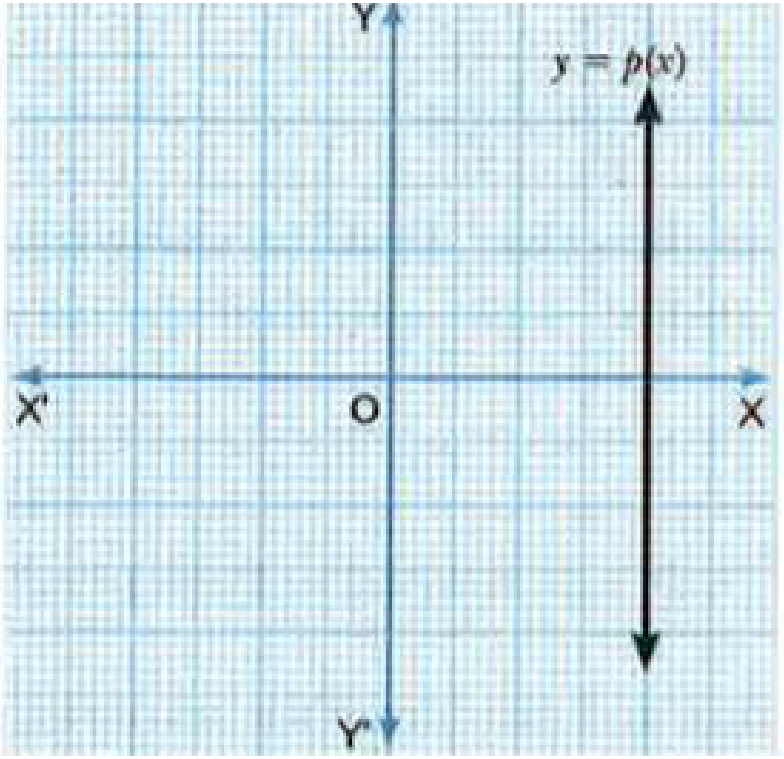
6. The graph of y = p(x) for some polynomials are given below. Find the number of zeros in each case.



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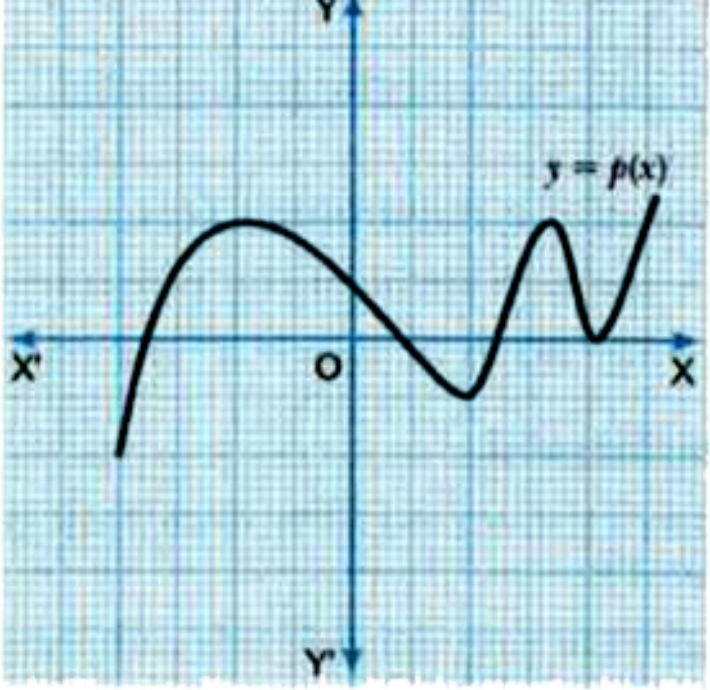

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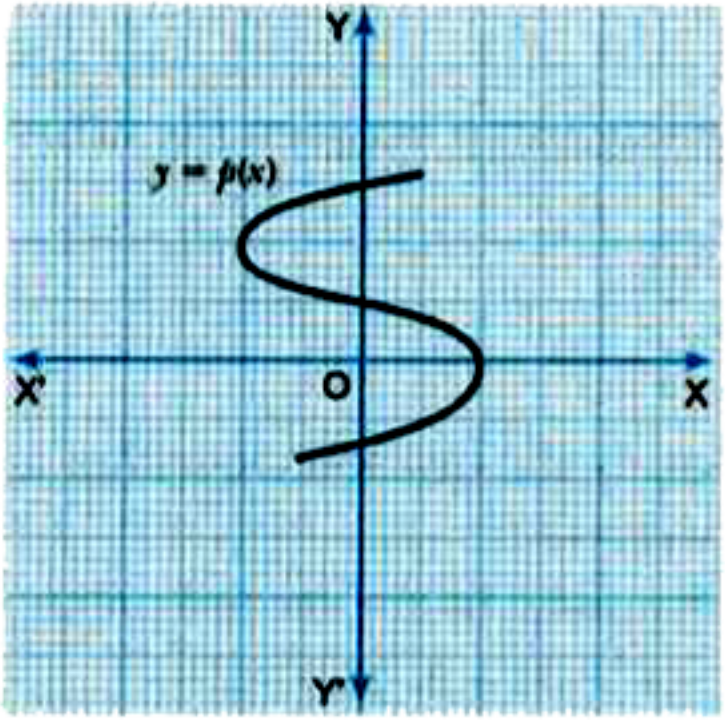
8. The graph of y = p(x) for some polynomials are given below. Find the number of zeros in each case.



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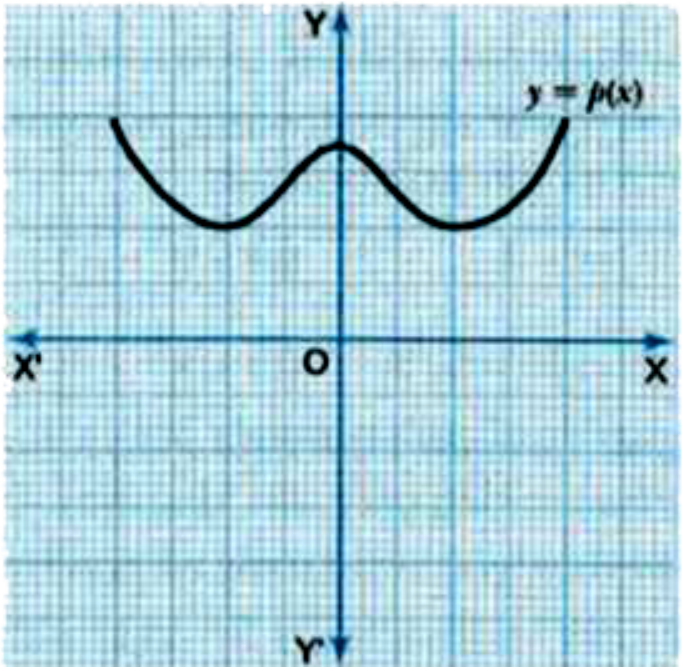
9. The graph of y = p(x) for some polynomials are given below. Find the number of zeros in each case.



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10. Can $(y+5)$ be the remainder on division of a polynomial $f(y)$ by $(y-2)$?

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11. Can $x^2 - 1$ be the quotient on division of $x^6 + 2x^3 + x - 1$ by a polynomial in x of degree 5?

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12. If on division of a non-zero polynomial p(x) by a polynomial g(x), the remainder is zero, what is the relation between the degrees of p(x) and g(x)?

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13. If on division of a polynomial p(x) by a polynomial g(x), the quotient is zero, what is the relation between the degrees of p(x) and g(x)?

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14. If one zero of the quadratic polynomial p(x) = $x^2 + 4kx - 25$ is negative of the other, find the value of k.

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Proficiency Exercise Short Answer Questions I

1. If α, β are the zeros of the polynomial $f(x) = x^2 - 3x + 2$, then find $\frac{1}{\alpha} + \frac{1}{\beta}$.

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2. If α and $\frac{1}{\alpha}$ are the zeroes of the polnomial $4x^2 - 2x + (k - 4)$, find the value of k.

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3. If α, β are the zeros of the polynomial $f(x) = ax^2 + bx + C$, then find $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$.

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4. If the sum of the zeros of the polynomial $f(x) = 2x^3 - 3kx^2 + 4x - 5$ is 6, then the value of k is

(a) 2 (b) 4 (c) -2 (d) -4

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5. If 1 is the zero of the quadratic polynomial $x^2 + kx - 5$, then the value of k is

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6. Find the zeros of the polynomial $5y^2 - 11y + 2$

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7. If one of the zeros of the quadratic polynomial $(k-2)x^2 - 2x - (k+5)$ is 4, find the value of k

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8. Are the following statements 'True' or 'False'? Justify your answer.

(i) If the zeroes of a quadratic polynomial $ax^2 + bx + c$ are both positive, then a,b and c all have the same sign.

(ii) If the graph of a polynomial intersects the X-axis at only one point, it cannot be a quadratic polynomial.

(iii) If the graph of a polynomial intersects the X-axis at exactly two points, it need not ve a quadratic polynomial.

(iv) If two of the zeroes of a cubic polynomial are zero, then it does not have linear and constant terms.

(v) If all the zeroes of a cubic polynomial are negative, then all the coefficients and the constant term of the polynomial have the same sign.

(vi) If all three zeroes of a cubic polynomial

$x^3 + ax^2 - bx + c$ are positive, then atleast one of a,b and c is non-negative.

(vii) The only value of k for which the quadratic polynomial $kx^2 + x + k$ has equal zeroes is $\frac{1}{2}$.

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9. Are the following statements 'True' or 'False'? Justify your answer.

(i) If the zeroes of a quadratic polynomial $ax^2 + bx + c$ are both positive, then a,b and c all have the same sign.

(ii) If the graph of a polynomial intersects the X-axis at only one point, it cannot be a quadratic polynomial.

(iii) If the graph of a polynomial intersects the X-axis at exactly two points, it need not ve a quadratic polynomial.

(iv) If two of the zeroes of a cubic polynomial are zero, then it does not have linear and constant terms.

(v) If all the zeroes of a cubic polynomial are negative, then all the coefficients and the constant term of the polynomial have the same sign.

(vi) If all three zeroes of a cubic polynomial $x^3 + ax^2 - bx + c$ are positive, then atleast one of a,b and c is non-negative.

(vii) The only value of k for which the quadratic polynomial $kx^2 + x + k$ has equal zeroes is $\frac{1}{2}$.

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(i) If the zeroes of a quadratic polynomial $ax^2 + bx + c$ are both positive, then a,b and c all have the same sign.

(ii) If the graph of a polynomial intersects the X-axis at only one point, it cannot be a quadratic polynomial.

(iii) If the graph of a polynomial intersects the X-axis at exactly two points, it need not ve a quadratic polynomial.

(iv) If two of the zeroes of a cubic polynomial are zero, then it does not have linear and constant terms.

(v) If all the zeroes of a cubic polynomial are negative, then all the coefficients and the constant term of the polynomial have the same sign.

(vi) If all three zeroes of a cubic polynomial $x^3 + ax^2 - bx + c$ are positive, then atleast one of a,b and c is non-negative.

(vii) The only value of k for which the quadratic polynomial $kx^2 + x + k$ has equal zeroes is $\frac{1}{2}$.

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11. 20:t If a and B are the zeroes of the quadratie polynomial$ax^2 + bx + c$, find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$

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12. If α, β are the zeros of the polynomial $x^2 + x - 6$, find the value of $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$.

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13. If one root of the polynomial $f(x) = x^2 + 5x + k$ is reciprocal of the other, find the value of k.

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14. If α, β are the two zeros of the polynomial $f(y) = y^2 - 8y + a$ and $\alpha^2 + \beta^2 = 40$, find the value of a.

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15. If α and β are zeros of $p(x) = x^2 + x - 1$, then find $\alpha^2\beta + \alpha\beta^2$.

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Proficiency Exercise Short Answer Questions Ii

1. If the sum of the zeros of the quadratic polynomial $f(t) = kt^2 + 2t + 3k$ is equal to their product, find the value of k.

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2. Find a quadratic polynomial each with the given numbers as the sum and product of the zeros respectively. (i) $\frac{2}{3}, -\frac{1}{3}$, (ii) $0, -4\sqrt{3}$, (iii) $-\frac{3}{2\sqrt{5}}, -\frac{1}{2}$, (iv) $\frac{21}{8}, \frac{5}{16}$

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

(i) $3x^2 + 4x - 4$, (ii) $7y^2 - \frac{11}{3}y - \frac{2}{3}$, (iii) $p^2 - 30$

(iv) $\sqrt{3}x^2 - 11x + 6\sqrt{3}$, (v) $a\left(x^2 + 1\right) - x\left(a^2 + 1\right)$, (vi) $6x^2 + x - 2$

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4. Give examples of polynomials p(x), g(x), g(x) and r(x), which satisfy the division algorithm and (i) $(ii)(iii)deg\ \ p((iv)x(v))\ \ = \ \ deg\ \ q((vi)x(vii))(viii)$ (ix) (ii) `(x) (xi) d eg"\ "q((x i i) x (xiii))"\ "="

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5. Check whether g(x) is a factor of p(x) by dividing the first polynomial by the second polynomial:

(i) $p(x) = 4x^3 + 8x + 8x^2 + 7, g(x) = 2x^2 - x + 1,$ (ii) $p(x) = x^4 - 5x - 2, g(x) = 2 - x^2,$ (iii) $p(x) = 13x^3 - 19x^2 + 12x + 14, g(x) = 2 - 2x + x^2$

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6. If $(x - 2)$ is a factor of $x^3 + ax^2 + bx + 16$ and $b = 4a$ find the values of a and b.

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7. If α and β are the zeros of the quadratic polynomial $f(x) = 3x^2 - 5x - 2$, then evaluate

(i) $\alpha^2 + \beta^2$, (ii) $\alpha^3 + \beta^3$, (iii) $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$

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8. If α and β are the zeros of the quadratic polynomial $f(x) = x^2 - p(x+1) - c$, show that $(\alpha+1)(\beta+1) = 1 - c$.

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9. What must be subtracted from $x^3 - 6x^2 + 13x - 6$ so that the resulting polynomial is exactly divisible

$x^2 + x + 1$?

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10. What must be added to $f(x) = x^4 + 2x^3 - 2x^2 + x - 1$ so that the resulting polynomial is divisible by $x^2 + x + 1$?

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11. If the polynomial $f(x) = ax^3 + bx - c$ is divisible by the polynomial $g(x) = x^2 + bx + c$, then $ab =$ (a) 1 (b) $\frac{1}{c}$ (c) -1 (d) $-\frac{1}{c}$

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12. If the zeroes of the quadratic polynomial $x^2 + (a+1)x + b$ are 2 and -3, then

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Proficiency Exercise Long Answer Questions

1. If α, β are zeroes of polynomial $6x^2 + x - 1$, then find the value of

(i) $\alpha^3\beta + \alpha\beta^3$, (ii) $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} + 2\left(\frac{1}{\alpha} + \frac{1}{\beta}\right) + 3\alpha\beta$

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2. If the zeros of the polynomial $f(x) = x^3 - 3x^2 - 6x + 8$ are of the form a-b,a,a + b, find all the zeros.

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3. If α and β are zeros of polynomial $f(x) = 2x^2 + 11x + 5$, then find

(i) $\alpha^4 + \beta^4$, (ii) $\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta$

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4. If α and β are the zeros of the polynomial $f(x) = 4x^2 - 5x + 1$, find a quadratic polynomial whose

zeros are $\frac{\alpha^2}{\beta}$ and $\frac{\beta^2}{\alpha}$

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5. Given that $\sqrt{3}$ is a zero of the polynomial $x^3 + x^2 - 3x - 3$, find its other two zeros.

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

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7. On dividing the polynomial $x^3 - 5x^2 + 6x - 4$ by a polynomial $g(x)$, quotient and remainder are $(x - 3)$ and $(-3x + 5)$ respectively. Find $g(x)$

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8. Verify that the numbers given alongside the cubic polynomials below are their zeros. Also verify the relationship between the zeros and the coefficients.

(i) $x^3 - 2x^2 - 5x + 6, \ -2, 1, 3,$ (ii) $2x^3 + 7x^2 + 2x - 3, 3, \ -1, \frac{1}{2}$

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9. (i) Obtain all other zeros of $2x^4 + 7x^3 - 19x^2 - 14x + 30$, if two of its zeros are $\sqrt{2}$ and $-\sqrt{2}$.

(ii) Obtain all other zeros of $2x^3 + x^2 - 6x - 3$, if two of its zeros are $-\sqrt{3}$ and $\sqrt{3}$.

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10. Find the cubic polynomial with the sum, sum of the products of its zeros taken two at a time, and the products of its zeros as – 3,-8 and 2 respectively.

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11. If α and β are the zeros of the quadratic polynomial $f(x) = 3x^2 - 7x - 6$, find a polynomial whose zeros are α^2 and β^2

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Self Assessment Test

1. Find the polynomial whose sum and product of the zeros are $-\frac{1}{2}$ and $\frac{1}{2}$ respectively.

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2. Can y + 1 be the remainder on division of a polynomial p(y) by y-5? Give reason.

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3. If α, β are the zeros of $kx^2 - 2x + 3k$ such that $\alpha + \beta = \alpha\beta$ then k = ?

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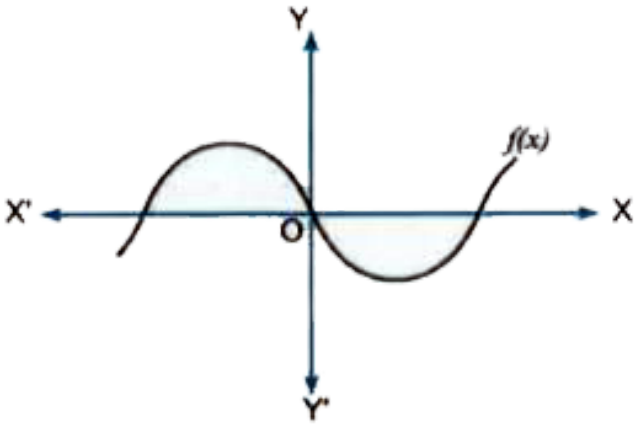
4. Find the number of zeros of the polynomial represented in Fig.



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5. What must be subtracted from $8x^4 + 14x^3 - 2x^2 + 7x - 8$ so that the resulting polynomial is exactly divisible by $4x^2 + 3x - 2$.

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6. If the remainder on division of $x^3 + 2x^2 + kx + 3$ by $x - 3$ is 21, then find the quotient and the value of k. Hence, find the zeroes of the cubic polynomial $x^3 + 2x^2 + kx - 18$.

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7. Find all the zeros of p(x) = $x^3 - 9x^2 - 12x + 20$ if (x+2) is a factor of p(x).

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8. if x+a is a factor of the polynomials $x^2 + px + q$ and $x^2 + mx + n$ prove that $a = \frac{n - q}{m - p}$

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9. Find the zeros of polynomial $f(x) = 4\sqrt{3}x^2 + 5x - 2\sqrt{3}$; and verify relation between zeros and its coefficient.

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10. Obtain all zeros of the polynomial $f(x) = x^4 - 3x^3 - x^2 + 9x - 6$, if two of its zeros are $-\sqrt{3}$ and $\sqrt{3}$.

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11. If α and β are the zeros of the quadratic polynomial $f(x) = 3x^2 - 7x - 6$, find a polynomial whose zeros are (i) α^2 and β^2, (ii) $2\alpha + 3\beta$ and $3\alpha + 2\beta$.

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