MATHS BASEMAKER

Class 10 Mathematics — Chapter 2: Polynomials

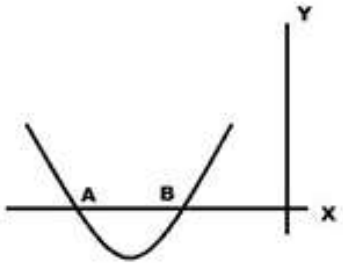
Chapter Test Paper

Q1. The zeroes of the quadratic polynomial $2x^2 + 5x - 12$ are:(a) both positive (b) both negative (c) one positive and one negative (d) both equal

Q2. The zeroes of the polynomial $x^2 - 2x - 3$ are:(a) -3, 1 (b) -3, -1 (c) 3, -1 (d) 3, 1

Q3. Which one is not a polynomial?(a) $x^3 - \sqrt{3}x^{-2} + 7$ (b) $x^3 - \sqrt{3}x^2 + 7$ (c) $x^{-3} - \sqrt{3}x^2 + 7$ (d) Both A and C

Q4. Graph of a quadratic polynomial p(x) is given. If it opens upwards and intersects the positive x-axis at two distinct points (2,0) and (4,0), which one of the following could be p(x)?(a) $3x^2 + 5x + 2$ (b) $-x^2 + 6x + 8$ (c) $-x^2 + 6x + 4$ (d) $x^2 - 6x + 8$



Youtube video link
[https://youtu.be/PSulmuhhLh0]

Q5. If one factor of $x^3 + 7kx^2 - 4kx + 12$ is $(x + 3)$, find the value of k.

Q6. Find the quadratic polynomial whose zeroes are $3 + \sqrt{5}$ and $3 - \sqrt{5}$.

Q7. If a and b are the zeroes of $x^2 - 6x + k$, find the value of k if $3a + 2b = 20$.

Q8Find the zeroes of the quadratic polynomial

$f(x) = 2x^2 - 4\sqrt{3}x + 6$

and verify the relationship between the zeroes and the coefficients of the polynomial.

Q9. A quadratic polynomial has zeroes a and b such that the sum of the zeroes is 8 and the sum of the cubes of the zeroes is 152. Find the quadratic polynomial.

Q10 Check whether quadratic equation $8\sec^2\theta - 6\sec\theta + 1=0$ can be exist or not ?

Video solution [https://youtu.be/PSulmuhhLh0]

HINTS & STEPS

Q1. Solution & Steps

Hint: Check the sign of the product of zeroes (c/a) or factorize the polynomial.

Answer: (c) one positive and one negative

Steps: Factorise : (2x-3)(x+4)……..one -ve…other +ve….

OR

For $p(x) = 2x^2 + 5x - 12$, $a = 2$, $b = 5$, $c = -12$.

Product of zeroes = $c/a = -12/2 = -6$.

Since the product of zeroes is negative, one zero is positive and the other is negative.

Zeroes are $x = 3/2$ and $x = -4$.

Q2. Solution & Steps

Hint: Factorize $x^2 - 2x - 3$ by splitting the middle term.

Answer: (c) 3, -1

Steps:

$x^2 - 2x - 3$

$x^2 - 3x + x - 3$

$(x - 3)(x + 1)$

Put $x-3 = 0$ and $x+1 = 0$

$x = 3$ and $x = -1$.

Q3. Solution & Steps

Hint: In a polynomial, the exponent of the variable x in every term must be a non-negative integer.

Answer: (d) Both A and C

Steps:

In expression (a), x has exponent -2, which is a negative integer.

In expression (c), x has exponent -3, which is a negative integer.

Since polynomial variables cannot have negative exponents, both (a) and (c) are not polynomials.

Q4. Solution & Steps

Hint: A parabola opening upwards has a positive leading coefficient ($a > 0$), and positive zeroes give a positive product and positive sum.

Answer: (d) $x^2 – 6x + 8$

Steps:

For zeroes $x = 2$ and $x = 4$, sum = 6 and product = 8.

Quadratic polynomial = $k(x^2 - Sx + P) = k(x^2 - 6x + 8)$.

Taking $k = 1$ gives $p(x) = x^2 - 6x + 8$, which opens upwards.

Q5. Solution & Steps

Hint: By the Factor Theorem, if $(x + 3)$ is a factor of $p(x)$, then $p(-3) = 0$.

Answer: $k = 1/5$

Steps:

Let $p(x) = x^3 + 7kx^2 - 4kx + 12$.

Since $(x + 3)$ is a factor, $p(-3) = 0$.

$(-3)^3 + 7k(-3)^2 - 4k(-3) + 12 = 0$

$-27 + 63k + 12k + 12 = 0$

$75k = 15 \Rightarrow k = 1/5$.

Q6. Solution & Steps

Hint: Find the sum (S) and product (P) of the zeroes, then use $p(x) = x^2 - Sx + P$.

Answer: $x^2 – 6x + 4$

Steps:

Sum of zeroes (S) = $(3 + \sqrt{5}) + (3 - \sqrt{5}) = 6$.

Product of zeroes (P) = $(3 + \sqrt{5})(3 - \sqrt{5}) = 3^2 - (\sqrt{5})^2 = 9 - 5 = 4$.

Quadratic polynomial = $x^2 - 6x + 4$.

Q7. Solution & Steps

Hint: Use relations $a + b = -B/A$ and $ab = C/A$ along with the equation $3a + 2b = 20$.

Answer: $k = -16$

Steps:

$a + b = 6 \Rightarrow 2a + 2b = 12$.

Given: $3a + 2b = 20$.

Subtracting gives $a = 8$.

$b = 6 - 8 = -2$.

Product of zeroes $k = ab = 8 \times (-2) = -16$.

Q8. Solution & Steps

$2x^2 - 4\sqrt{3}x + 6 = 0$

Dividing by 2:

$x^2 - 2\sqrt{3}x + 3 = 0$

$(x - \sqrt{3})^2 = 0$

Therefore, the zeroes are:

$\alpha = \sqrt{3}, \beta = \sqrt{3}$

now verify zeroes relationship with coefficients

Q9. Solution & Steps

Hint: Given $a + b = 8$ and $a^3 + b^3 = 152$. Use identity $(a + b)^3$ to solve for product ab.

Answer: $x^2 - 8x + 15$

Q10 First Factories get zeroes and check using trigonometric ratio the value of $\sec\emptyset$ exist or not.

Video solution [https://youtu.be/PSulmuhhLh0]