CBSE 10th Polynomials Unsolved Paper

CBSE 10th Polynomials
Unsolved Paper

Question1:
Find the zeroes of each of the following quadratic polynomials and verify the relationship between the zeroes and their coefficient:

(i) $\mathbf{f(x) = x^2 - 2x - 8}$
(ii) $\mathbf{q(x) = \sqrt{3}x^2 + 10x + 7\sqrt{3}}$
(iii) $\mathbf{h(t) = t^2 - 15}$
(iv) $\mathbf{f(x) = x^2 - (\sqrt{3} + 1)x + \sqrt{3}}$
(v) $\mathbf{g(x) = a(x^2 + 1) - x(a^2 + 1)}$
(vi) $\mathbf{f(x) = x^2 - 2\sqrt{2x} + 6}$
(vii) $\mathbf{f(x) = x^2 - 3 = 7x}$

Question2:

If α and β the zeroes of the quadratic polynomial f(x) = $ax^2 + bx + c$, then evaluate:

(i) $\mathbf{\alpha - \beta}$

(ii) $\mathbf{\frac{1}{\alpha} - \frac{1}{\beta}}$

(iii) $\mathbf{\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta}$

(iv) $\mathbf{\alpha^2\beta + \alpha\beta^2}$

(v) $\mathbf{\alpha^4 + \beta^4}$

(vi) $\mathbf{\frac{\beta}{a\alpha+b} + \frac{\alpha}{\alpha\beta+b}}$

(vii) $\frac{1}{a\alpha+b}+\frac{1}{a\beta+b}$

(viii) $a\left[\frac{\alpha^2}{\beta}+\frac{\beta^2}{\alpha}\right]+b\left[\frac{\alpha}{\beta}+\frac{\beta}{\alpha}\right]$

Q.3. If α and β are the zeros of the quadratic polynomial $f(x) = 6x^2 + x - 2$ find the value of $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}$

Q.4. If α and β are the zeroes of the quadratic polynomial $p(x) = 4x^2 - 5x - 1$, find the value of $\alpha^2\beta + \alpha\beta^2$.

Q.5. If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - x - 4$, find the value of $\frac{\alpha}{\beta}+\frac{1}{\alpha}+\frac{1}{\beta}-\alpha\beta$

Q.6. If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - x - 2$, find the value of $\frac{1}{\alpha}-\frac{1}{\beta}$.

Q.7. If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - 5x + 4$, find the value of $\frac{1}{\alpha}-\frac{1}{\beta}-2\alpha\beta$

Q.8. If α and β are the zeroes of the quadratic polynomial $f(t) = t^2 - 4t + 3$, find the value of $\alpha^4\beta^3 + \alpha^3\beta^4$

Q.9. If α and β are the zeroes of the quadratic polynomial $p(y) = 5y^2 - 7y + 1$, find the value of $\frac{1}{\alpha}+\frac{1}{\beta}$

Q.10. If α and β are the zeroes of the quadratic polynomial $p(s) = 3s^2 - 6s + 4$, find the value of $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}+2\left[\frac{1}{\alpha}+\frac{1}{\beta}\right]+3\alpha\beta$

Q.11 If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - px + q$, prove that

$$\frac{\alpha^2}{\beta^2} + \frac{\beta^2}{\alpha^2} = \frac{p^4}{q^2} - \frac{4p^2}{q} + 2$$

Q.12 If the squared difference of the zeroes of the quadratic polynomial $f(x) = kt^2 + 2t + 3k$ is equal to their product, find the value of k.

Q.13. If one zero of the quadratic polynomial $f(x) = 4x^2 - 8kx - 9$ is negative of the other, find the value of k.

Q.14. If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - 1$, find a quadratic polynomial whose zeroes are $\frac{2\alpha}{\beta}$ and $\frac{2\beta}{\alpha}$

Q.15. If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - 3x - 2$, find a quadratic polynomial whose zeroes are $\frac{1}{2\alpha+\beta} + \frac{1}{2\beta+\alpha}$

Q.16. If α and β are the zeroes of a quadratic polynomial such that a + 13 = 24 and $\alpha - \beta = 8$, find a quadratic polynomial having α and β as its zeroes.

Q.17. If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - p(x + 1) - c$, Show that $(\alpha + 1)(\beta + 1) = 1 - c$.

Q.18. If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - 2x + 3$, find a polynomial whose roots are $(i)\ \alpha + 2,\ \beta + 2\ \ (ii)\ \frac{\alpha-1}{\alpha+1}, \frac{\beta-1}{\beta+1}$

Q.19: If α and β are the zeroes of the polynomial $f(x) = x^2 + px + q$, form a polynomial whose zeroes are $(\alpha + \beta)^2$ and $(\alpha - \beta)^2$.

Q.20. Verify that the numbers given alongside of the cubic polynomials below are their zeroes. Also, verify the relationship between the zeroes and coefficients in each case:

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

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

Q.21. Find a cubic polynomial with the sum, sum of the product of its zeroes taken at a time, and product of its zeroes as 3, -1, and -3 respectively.

Q.22. If the zeroes of the polynomial $f(x) = 2x^3 - 15x^2 + 37x - 30$ are in A.P., find them.

Q.23. Find the condition that the zeroes of the polynomial $f(x) = x^3 + 3px^2 + 3qx + r$ may be in A.P.

Q.24. If the zeroes of the polynomial $f(x) = ax^3 + 3bx^2 + 3cx + d$ are in A.P., prove that $2b^3 - 3abc + a^2d = 0$

Question 25:

If the zeroes of the polynomial $f(x) = x^3 - 12x^2 + 39x + k$ are in A.P., find the value of k.

Question 26:

Apply division algorithm to find the quotient $q(x)$ and remainder $r(x)$ on dividing $f(x)$ by $g(x)$ in each of the following:

(i) $f(x) = x^3 - 6x^2 + 11x - 6, g(x) = x^2 + x + 1$

(ii) $f(x) = 10x^4 + 17x^3 - 62x^2 + 30x - 3,\ g(x) = 2x^2 + 7x + 1$

(iii) $f(x) = 4x^3 + 8x^2 + 8x + 7,\ g(x) = 2x^2 - x + 1$

(iv) $f(x) = 15x^3 - 20x^2 + 13x - 12, g(x) = x^2 - 2x + 2$

Question27:

Check whether the first polynomial is a factor of the second polynomial by applying the division algorithm:

(i) $g(t) = t^2 - 3$; $f(t) = 2t^4 + 3t^3 - 2t^2 - 9t$

(ii) $g(x) = x^2 - 3x + 1$; $f(x) = x^5 - 4x^3 + x^2 + 3x + 1$

(iii) $g(x) = 2x^2 - x + 3$; $f(x) = 6x^5 - x^4 + 4x^3 - 5x^2 - x - 15$

Question 28:

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

Question 29:

What must be subtracted from the polynomial $x^4 + 3x^3 - 13x^2 - 12x + 21$**, so that the resulting polynomial is exactly divisible by** $x^2 - 4x + 3$?