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CBSE 10th Polynomials Unsolved Paper

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Question1:

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

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

Question2:

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

- (i) $\alpha \beta$
- (ii) $\frac{1}{\alpha} \frac{1}{\beta}$
- (iii) $\frac{1}{\alpha} + \frac{1}{\beta} 2\alpha\beta$
- (iv) $\alpha^2\beta + \alpha\beta^2$
- (v) $\alpha^4 + \beta^4$
- (vi) $\frac{\beta}{a\alpha+b} + \frac{\alpha}{\alpha\beta+b}$

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

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

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

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- 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 $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} + 2\left\lfloor \frac{1}{\alpha} + \frac{1}{\beta} \right\rfloor + 3\alpha\beta$

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

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

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.

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- 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:

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(*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

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- 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:

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

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

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(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 $x^2 - 4x + 3$?

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