Class X WORKSHEET 1

I. If α, β are the zeroes of the polynomial, such that $\alpha + \beta = 6$ and $\alpha\beta = 4$, then write the polynomial.

II. If α, β, γ are the zeroes of the polynomial $x^3 + 2x^2 - 4x + 1$, find the values of $\sum \alpha$ and $\sum \alpha^2$.

III. If α, β are the zeroes of the polynomial $ax^2 + bx + c$,then find the value of $\alpha^2 + \beta^2$.

IV. If α, β are the zeroes of the polynomial $f(x) = ax^2 + bx + c$, *then find the value of* $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$.

V. If α and β are the zeroes of the quadratic polynomial $x^2 - 6x + a$, find the value of 'a' if $3\alpha + 2\beta = 20$

VI. If m and n are the zeroes of the polynomial $3x^2 + 11x - 4$, find the value of $\frac{m}{n} + \frac{n}{m}$.

VII. If the zeroes of the polynomial $x^2 - px + q$ are in the ratio 2 : 3, prove that $6p^2 = 25q$.

VIII. Verify that 2,1,1 are the zeroes of polynomial $2x^3 + x^2 - 5x + 2$. Also verify relation between the coefficients and zeroes.

IX. If α, β and γ are the zeroes of the cubic polynomial $p(x) = 5x^3 - 7x^2 - 13x - 5 = 0$, then find the value of $\sum \frac{1}{\alpha}$.

X. Find the zeroes of the polynomial $x^3 - 12x^2 + 39x - 28$ if the zeroes are in A.P.

XI. If α, β and γ are the zeroes of the cubic polynomial $3x^2 - 5x^2 - 11x - 3$,then find the values of $\alpha + \beta + \gamma$ and $\alpha\beta\gamma$.

XII. Form the cubic polynomial whose zeroes are the value of α, β, γ, given by the relations $\sum \alpha = 3, \sum \alpha^2 = 2, \sum \alpha^3 = 3$.

XIII. If α *and* β are the zeroes of a polynomial $x^2 + 6x + 9$, then form a polynomial whose zeros are $-\alpha$ and $-\beta$.

XIV. Quadratic polynomial $2x^2 - 3x + 1$ has zeroes as α and β. Now form a quadratic polynomial whose zeroes are 3α and 3β.

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

XVI. Find the value of k in order that one zero of $3x^2 + (1 + 4k)x + k^2 + 5$ may be one-third of the other.

XVII. If the zeroes of $ax^2 + bx + c$ be in the ratio 4:5 , show that $20b^2 = 81ac$.

XVIII. Find the zeroes of polynomial $x^3 - 15x^2 + 71x - 105$, given that the zeroes are in A.P.

XIX. If one zero of the polynomial $(a^2 + 9)x^2 + 13x + 6a$ is the reciprocal of the other, then find 'a'.

XX. If α and β are the zeroes of the quadratic polynomial $x^2 - (k + 6)x + 2(2k - 1)$, find the value of k so that $\alpha + \gamma = \frac{\alpha\beta}{2}$

XXI. If m and n are zeroes of $ax^2 - 5x + c$, find the values of a and c if $m + n = m.n = 10$.

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

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

XXIV. If the remainder on dividing of $x^3 - kx^2 + 13x - 21$ by $2x - 1$ is -21, find the quotient and the value of k. Hence , find the zeros of the cubic polynomial $x^3 - kx^2 + 13x$.

XXV. Given that $\sqrt{2}$ is a zero of the cubic polynomial $6x^3 + \sqrt{2x^2} - 10x - 4\sqrt{2}$, find its other two zeroes.

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

XXVII. If the polynomial $6x^4 + 8x^3 + 17x^2 + 21x + 7$ is divided by another polynomial $3x^2 + 4x + 1$, the remainder comes out to be $ax + b$, then find a and b.

XXVIII. If the polynomial $6x^4 + 8x^3 - 5x^2 + ax + b$ is exactly divisible by the polynomial $2x^2 - 5$, then find the values of a and b.

XXIX. If $x^2 + x - 12$ divides $p(x) = x^3 + ax^2 + bx - 84$ exactly, find a and b.

XXX. On dividing $p(x) = 5x^4 - 4x^3 + 3x^2 - 2x + 1$ by $g(x) = x^2 + 2$, if $q(x) = ax^2 + bx + c$, find a, b and c.

XXXI. Obtain all the other zeroes of the polynomial $x^4 + 4x^3 - 2x^2 - 20x - 15$ if two of its zeroes are √5 and -√5.

XXXII. On dividing $x^3 - 8x^2 + 20x - 10$ by a polynomial g(x), the quotient and the remainder were $x - 4$ and 6 respectively. Find g(x).

XXXIII. If $(x + q)$ is a factor of two polynomials $x^2 + px + q$ and $x^2 + mx + n$, then prove that $a = \frac{(n-q)}{(m-p)}$.

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

XXXV. What must be subtracted or added to $p(x) = 8x^4 + 14x^3 - 2x^2 + 8x - 12$ so that $4x^2 + 3x - 2$ is a factor of p(x).

XXXVI. If the polynomial $x^4 - 6x^3 + 16x^2 - 25x - 10$ is divided by $x^2 - 2x + k$, the remainder comes out to be x + a, find k and a.

XXXVII. Given that one of the roots of the cubic polynomial $ax^3 + bx^2 + cx + d$ is 0, find the product of other two roots.

XXXVIII. If α, β, γ are the zeros of the polynomial $4x^3 - 2x^2 + x - 1$, then find the value of $\alpha^{-1} + \beta^{-1} + \gamma^{-1}$.

XXXIX. If one of the zeros of the cubic polynomial $x^3 + ax^2 + bx + c$ is -1, then find the product of other two zeros.

XL. Find the condition so that the zeros of $x^3 + px^2 + qx + r$ are in A.P.

XLI. If α, β, γ are the zeros of the cubic polynomial $x^3 + 4x + 2$,then find the value of $\frac{1}{\alpha+\beta} + \frac{1}{\beta+\gamma} + \frac{1}{\gamma+\alpha}$.

XLII. If α, β are the zeros of the $2x^2 - 5x + 7$, then find a polynomial whose zeros are $2\alpha + 3\beta, 3\alpha + 2\beta$.

XLIII. Find k, if the sum of the zeros of the polynomial $x^2 - (k + 6)x + 2(2k - 1)$ is half their product.

XLIV. If the zeros of the polynomial $x^2 + px + q$ are double in value to the zeroes of $2x^2 - 5x - 3$, find the values of p and q.

XLV. Write the polynomial, the product and sum of whose zeroes are $-\frac{9}{2}$ and $-\frac{3}{2}$ respectively.