Grade 10 CBSE

Polynomials

Q1) Find the zeroes of the polynomial $x^2 - 5$ and verify the relationship between the zeroes and the coefficients.

Q2) Find the quadratic polynomial, the sum and product of whose zeroes are -4 and 5 respectively.

Q3) If zeroes of the polynomial $x^3 - 3x^2 + x + 1$ $are\ a - b, a,\ a$ +b, find $a\ and\ b$.

Q4) If two zeroes of the polynomial $x^4 - 6x^3 - 26x^2 + 138x - 35$ are $2 \pm \sqrt{3}$, Find other zeroes.

Q5) If the polynomial $3x^4 + 5x^3 - 7x^2 + 2x + 2$ is divided by another polynomial $x^2 + 3x + m, the\ remainder\ is\ \ 2x + n\ then\ find\ m\ and\ n.$

Q6) Divide

i)$x^3 + x^2 + 2x + 3$ by $x + 2$.

ii) $x^4 + x^3 + x^2 + 2x + 3$ by $x^2 + 5$

Q7) If a and b are zeroes of the x2+7x+7x2+7x+7, find the value of a-1+b-1−2aba−1+b−1−2ab

Answer key

Sol 1) $x^2 - 5$ =($x + \sqrt{5}$) ($x - \sqrt{5}$) hence zeroes are $\sqrt{5}$ $and - \sqrt{5}$.

Now α + β = $\sqrt{5} + (-\sqrt{5})$ = 0 = $\frac{0}{1}$ $= \{\frac{-(coefficient\ of\ x)}{coefficient\ of\ x^2}\}$,

Aβ = $(\sqrt{5})(-\sqrt{5}) = -5 = \frac{-5}{1} = \{\frac{(constant\ term)}{coefficient\ of\ x^2}\}$,

Sol 2) Hint {α + β = -4 = -4/1, hence coefficient of x = 4}, { αβ = 5, hence constant term = 5}, Therefore required polynomial is $x^2 + 4x + 5$.

Sol 3) a = 1, b = $\sqrt{2}$

[Hint α + β + γ = $(a - b + a + a + b) = 3a = \frac{-(-3)}{1}$ = 3 ⟹ a = 1,

αβγ = -1 ⟹ $(a^3 - b^2 a) = -1$ ⟹ 1 - b^2 = -1, $b^2 = 2, b = \sqrt{2}$.]

Sol 4) (-5,7)

Two zeroes of the polynomial p(x) = $x^4 - 6x^3 - 26x^2 + 138x - 135$ are 2 ±$\sqrt{3}$

Therefore, x = 2 ± $\sqrt{3}$ x - 2 = ± $\sqrt{3}$

Squaring both sides,

x^2 -4x + 4 = 3

x^2 -4x + 1= 0

Now let us divide the polynomial p (x) by x^2 -4x + 1 so that other zeroes may be obtained.

We get,

polynomial p (x) = $x^4 - 6x^3 - 26x^2 + 138x - 135$

= (x^2 -4x + 1) (x^2 -2x -35)

= x^2 -4x + 1) (x + 5) (x – 7)

(x + 5) and (x – 7) will be the other factors. Hence -5 and 7 will be the other zeroes.

Sol 5) (1,2)

Sol 6) i) $x^2 - x + 4$ remainder =5, ii) $x^2 - 4x + 21$

i)	ii)
$x+2)\overline{x^3 + x^2 + 2x + 3}(x^2 - x + 4$	$X^2+5x)\overline{x^4 + x^3 + x^2 + 105x}(x^2 - 4x + 21$
$- \underline{x^3 + 2x^2}$	$- \underline{x^4 + 5x^3}$
$-x^2 + 2x$	$-4x^3 + x^2$
$- \underline{-x^2 - 2x}$	$- \underline{-4x^3 - 20x^2}$
$4x + 3$	$21x^2 + 105x$
$- \underline{4x + 8}$	$- \underline{21x^2 + 105x}$
-5	0

Sol 7)

$f(x)=x^2+7x+7$

we get

$a + b = -7$

$ab = 7$

Now

$a^{-1}+b^{-1}-2ab =$

$=\frac{a+b-2a^2b^2}{ab}$

$=\frac{-7-98}{7}=-15$