Theory Of Equations

Polynomials

Horner's Method Of Synthetic Division

Use synthetic division to express $f(x) = x^3 - 6x^2 + 8x + 7$ as a polynomial in powers of $x+2$.

Sol. The Given Polynomial is

$$f(x) = x^3 - 6x^2 + 8x + 7.$$

Let $f(x) = a_0 + a_1(x+2) + a_2(x+2)^2 + a_3(x+2)^3$ — (1)

Where a_0, a_1, a_2, a_3 are Constants.

Divide $f(x)$ by $x+2$ by synthetic division repeatedly.

	1	−6	8	7
−2		−2	16	−48
	1	−8	24	−41 $= a_0$
−2		−2	20	
	1	−10	44 $= a_1$	
−2		−2		
	1	−12 $= a_2$		
	1 $= a_3$.			

Put Values of a_0, a_1, a_2 and a_3 in (1)

$$f(x) = -41 + 44(x+2) - 12(x+2)^2 + (x+2)^3$$

Ans