

Theory Of Equations

Polynomials

Horner's Method Of Synthetic Division

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

Calculate $f(x+2)$

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

first of all express $f(x)$ in Powers of

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

where a_0, a_1, a_2, a_3 are constants.

Divide $f(x)$ by $(x-2)$ using synthetic division repeatedly

2		1	6	8	7	
			2	16	48	
						$55 = a_0$
2		1	8	24		
			2	20		
						$44 = a_1$
2		1	10			
			2			
						$12 = a_2$
		1				$= a_3$

Put values of a_0, a_1, a_2, a_3 in ①

$$f(x) = 55 + 44(x-2) + 12(x-2)^2 + 1(x-2)^3$$

Replace x by $x+2$.

$$f(x+2) = 55 + 44x + 12x^2 + x^3.$$

which is required polynomial.