

# Theory Of Equations

## Polynomials

### Horner's Method Of Synthetic Division

find  $a$  and  $b$  so that  $x-3$  and  $x-1$  may be factor of

$$f(x) = 2x^4 - 7x^3 + ax + b$$

Sol.  $x-3$  is factor of  $f(x)$

$\therefore$  By synthetic division

3	2	-7	0	a	b	
		6	-3	-9	3a-27	
	2	-1	-3	a-9	3a+b-27	

Remainder = 0

$$3a + b - 27 = 0 \quad \text{--- (1)}$$

Now also  $x-1$  is factor of  $f(x)$  Remainder should be 0

By synthetic division.

$$\begin{array}{r|cccccc}
 & 2 & -7 & 0 & a & b \\
 1 & & 2 & -5 & -5 & a-5 \\
 \hline
 & 2 & -5 & -5 & a-5 & a+b-5
 \end{array}$$

$$a + b - 5 = 0 \quad \text{--- (2)}$$

$$3a + \cancel{b} - 27 = 0$$

$$\begin{array}{r}
 a + \cancel{b} - 5 = 0 \\
 \hline
 \phantom{a} + \phantom{b} + \phantom{0} = 0
 \end{array}$$

$$2a - 22 = 0$$

$$2a = 22$$

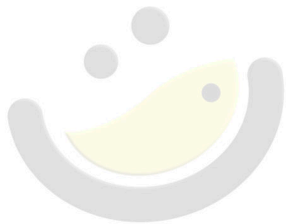
$$a = \underline{\underline{11}}$$

Put  $a = 11$  in ②

$$11 + b - 5 = 0$$

$$\underline{\underline{b = -6.}} \quad \underline{\underline{\text{Ans.}}}$$

$$a = 11 \text{ and } \underline{\underline{b = -6}}$$



OMG! MATHS }  
The poetry of logical ideas.