

10/16/00

Real Polynomials

$$p(x) = x^n + a_{n-1}x^{n-1} + \dots + a_1x + a_0$$

$$= \sum_{i=0}^n a_i x^i, \quad \text{real } a_i, \quad n \geq 2, \quad a_n = 1$$

$$\pi(x + c_j) \pi(x^2 + s_{j-1}x + s_{j-2})$$

assume a factor:

$$d(x) = x^2 + d_1x + d_0 = \sum_{j=0}^2 d_j x^j$$

$$\text{then } q(x) = \sum_{k=0}^{n-2} b_k x^k, \quad b_{n-2} = 1, \quad d_2 = 1$$

for

$$p(x) = q(x) \cdot d(x) + \underbrace{r_1x + r_0}_{\text{remainder}}$$

$$R(x) = r_1x + r_0$$

$$\text{derive } R(x) = 0$$

$$\begin{aligned} \text{Here } q(x) \cdot d(x) &= \left(\sum_{k=0}^{n-2} b_k x^k \right) \left(\sum_{j=0}^2 d_j x^j \right) \\ &= \sum_{k=0}^{n-2} \sum_{j=0}^2 b_k \cdot d_j \cdot x^{k+j} \end{aligned}$$