

P.6 : Factoring and Solving Polynomials

1) a. Graph $P(x)$ and find the roots (x-int, zeros)

$$P(x) = x^3 + 4x^2 - 11x - 30$$

$$x\text{-int : } -5, -2, 3$$

$$x = -5 \quad x = -2 \quad x = 3$$

b. Write $P(x)$ in factored form.

$$P(x) = (x+5)(x+2)(x-3)$$

2) Is $(x + 2)$ a factor of $P(x)$? *Yes*
How do we check?

$$P(-2) = (-2)^3 + 4(-2)^2 - 11(-2) - 30$$

$$P(-2) = 0$$

3) How do we find the other factors of $P(x)$?

a. Divide

b. Write your answer as (divisor)(quotient)

c. Factor (GCF, x-box, special cases, quadratic formula)

$$\begin{array}{r} x^2 + 2x - 15 \\ a) x+2 \overline{) x^3 + 4x^2 - 11x - 30} \\ \underline{-(x^3 + 2x^2)} \downarrow \\ 2x^2 - 11x \\ \underline{-(2x^2 + 4x)} \\ -15x - 30 \\ \underline{-(-15x - 30)} \\ 0 \end{array}$$

$$P(x) = (x+2)(x^2 + 2x - 15)$$

a.c

$$a=1 \quad b=2 \quad c=-15$$

$$\begin{array}{ccc} & -15 & \\ -3 & \cdot & 5 \\ & + & \\ & 2 & \\ \textcircled{c} & b & \end{array}$$

$$(x-3)(x+5)$$

$$P(x) = (x+2)(x-3)(x+5)$$

4) Sketch the graph using the end behavior and the x-int.

Degree: 3

Pos: ↓

