BEFORE YOU READ

Read the structure, pick the technique

Factoring always starts with the greatest common factor; after that, the number of terms and the leading coefficient point to the technique.

- L0 **Factoring a polynomial**
  - L1 **First move: extract the GCF** any polynomial — $6x^3 + 9x^2 - 3x \to 3x(2x^2 + 3x - 1)$
  - L1 **Two terms** difference of squares, sum or difference of cubes — $9x^2 - 16 \to (3x + 4)(3x - 4)$
  - L1 **Three terms**
    - L2 **Leading coefficient 1** find m·n = c and m + n = b — $x^2 + 7x + 12$
    - L2 **Leading coefficient ≠ 1** AC method — $6x^2 + 11x + 4$
  - L1 **Four or more terms** grouping — $x^3 + 2x^2 + 3x + 6$
  - L1 **Higher degree**
    - L2 **Only even powers** substitute u = x^2 — $x^4 + 5x^2 + 6$
    - L2 **Known root r** divide by (x − r)

TAKEAWAY

Inspect again after every step

After any step, re-inspect each factor for further factoring, and verify by expanding back.