

Sketching Polynomials from Factors

Part 1 — Factored Form (Monic, Cubic & Quartic)

For each function:

1. Determine the roots.
2. Determine the y-intercept.
3. Label the roots and the y-intercept on a coordinate grid.
4. Sketch the function, showing correct end behaviour and intercepts.

$$y = (x - 1)(x - 2)(x - 3)$$

$$y = (x - 2)(x + 2)(x + 3)$$

$$f(x) = (x - 7)(x + 1)(x + 4)$$

$$y = (x + 1)(x - 2)(x + 2)(x + 1)$$

$$y = (x - 1)(x + 2)(x - 4)(3x - 4)$$

$$y = (x + 3)(x - 4)(2x - 1)(4x + 1)$$

$$f(x) = (2x + 1)(3x - 2)(4x + 5)$$

Part 2 — Factored Form with Leading Coefficients & Reflections

For each function:

1. Determine the roots.
2. Determine the y-intercept.
3. Label the roots and the y-intercept on a coordinate grid.
4. Sketch the function, showing correct end behaviour and intercepts.
5. State the degree and leading coefficient.

$$y = 2(x + 1)(x - 2)(x + 3)$$

$$y = -1(x - 2)(x - 1)(x + 2)$$

$$f(x) = -(x - 7)(x + 1)(x + 4)$$

$$f(x) = -2(2x - 3)(x - 5)(x + 7)$$

$$y = \frac{1}{4}(x - 2)(2x + 5)(x + 6)$$

$$y = -2(x + 3)(x - 4)(x + 1)(x - 2)$$

$$y = x(x + 3)(x - 1)(x + 5)(x - 4)$$