

Multiplying Polynomials

→ polynomial \cdot a polynomial

Ex. $(x+4)(x^2+2x-8)$

$$(x+4)(x^2) + (x+4)(2x) + (x+4)(-8)$$

$$x^3 + 4x^2 + 2x^2 + 8x - 8x - 32$$

$$x^3 + 6x^2 - 32$$

Idea: Each term in the 1st
polynomial is distributed to
each term in the 2nd
polynomial.

$$(x-3)(x^2+3x+9)$$

$$x^3 + \cancel{3x^2} + \cancel{9x} - \cancel{3x^2} - \cancel{9x} - 27$$

$$x^3 - 27$$

$$(x+4)(x+2) = x^2 + \underbrace{2x + 4x}_{6x} + 8$$
$$= x^2 + 6x + 8$$

$$(x-4)(x+2) = x^2 + \underbrace{2x}_{2x} - \underbrace{4x}_{4x} - 8$$
$$= x^2 - 2x - 8$$

$$(x+4)(x-2) = x^2 - 2x + 4x - 8$$
$$= x^2 + 2x - 8$$

$$(x-4)(x-2) = x^2 - 2x - 4x + 8$$
$$= x^2 - 6x + 8$$

$$(2x+3)(6x-4) = 12x^2 - 8x + 18x - 12$$
$$= 12x^2 + 10x - 12$$

$$5t^4(t+3)(3t-1)$$

$$(5t^5 + 15t^4)(3t-1)$$

$$15t^6 - 5t^5 + 45t^5 - 15t^4$$

$$15t^6 + 40t^5 - 15t^4$$

$$2 \cdot 3 \cdot 4$$
$$6 \cdot 4 = 24$$

$$(a+b)(c+d)$$

FOIL

first
outer
inner
last