

5-4, Multiplying Polynomials

$$\textcircled{a} \quad x^2 + x$$

$$\textcircled{b} \quad x^2 (x^1) = x^{2+1} = x^3$$

Write a polynomial in standard form (multiply)

$$\textcircled{1} (2^2 x^3)(4^2 x^5 y)$$

$$\textcircled{2} 5x^4 (3x^2 - 2x + 4) \text{ Distribute}$$

$$\textcircled{3} 5x^4 + (3x^2 - 2x + 4)$$

$$\textcircled{4} (2x^3 - 4)(3x^3 + 6) \text{ Distribute (FOIL)}$$

$$\textcircled{1} (2^2 x^3)(4^2 x^5 y)$$
$$(4x^3)(16x^5 y)$$

$$4 \cdot 16 \quad x^3 \cdot x^5 \quad y$$

$$(64x^8 y)$$

② $5x^4 (3x^2 - 2x + 4)$ Distribute

$$5x^4 \cdot 3x^2 + 5x^4 \cdot -2x + 5x^4 \cdot 4$$

$$15x^6 - 10x^5 + 20x^4$$

$$x^3 + x^5 = \textcircled{x^5 + x^3}$$

Add/Subtract - combine like terms only. It is not x^8

$$x^3(x^5) = \text{multiply so add exponents} = x^8$$

$$\textcircled{3} \quad 5x^4 + (3x^2 - 2x + 4)$$
$$5x^4 + 3x^2 - 2x + 4$$

④ $(2x^3 - 4)(3x^3 + 6)$ Distribute
(FOIL)

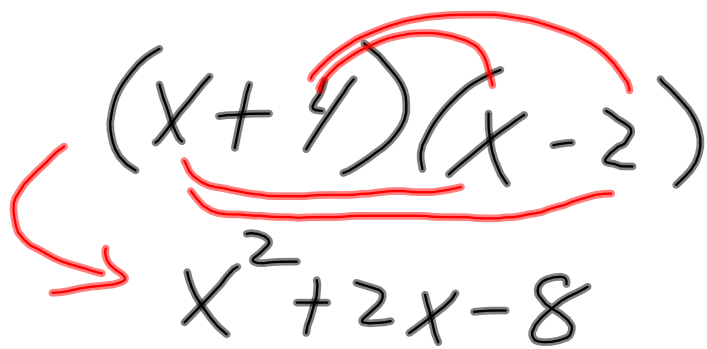
$(2x^3 - 4)(9x^3 + 6)$

$$2x^3 \cdot 9x^3 + 2x^3 \cdot 6 + -4 \cdot 9x^3 + -4 \cdot 6$$

$$18x^6 + 12x^3 - 36x^3 - 24$$

$$18x^6 - 24x^3 - 24$$

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



$$x^2 + 2x - 8$$

$$\textcircled{a} x^2 \cdot y^2 = x^2 y^2$$

$$\textcircled{b} x^2 \cdot x^2 = x^4$$

$$\textcircled{c} 3^2 \cdot 3^2 = 3^{2+2} = 3^4 = \textcircled{81}$$

$$\textcircled{d} 3^2 \cdot 2^2 = 9 \cdot 4 = \textcircled{36}$$

$$(2x - 3)(5x^2 - 6x + 7)$$

$$2x \cdot 5x^2 + 2x \cdot (-6x) + 2x \cdot 7 + (-3) \cdot 5x^2 + (-3) \cdot (-6x) + (-3) \cdot 7$$
$$10x^3 - 12x^2 + 14x - 15x^2 + 18x - 21$$

$$10x^3 - 27x^2 + 32x - 21$$

$$(2x-3)(5x^2-6x+7)$$

$$2x \cdot 5x^2 + 2x \cdot -6x + 2x \cdot 7 + -3 \cdot 5x^2 + -3 \cdot -6x + -3 \cdot 7$$
$$10x^3 - 12x^2 + 14x - 15x^2 + 18x - 21$$

$$10x^3 - 27x^2 + 32x - 21$$

$$(2x^2 - 3y)(4x^2 + y)$$

$$2x^2 \cdot 4x^2 + 2x^2 \cdot y + -3y \cdot 4x^2 + -3y \cdot y$$

$$8x^4 + 2x^2y + -12x^2y - 3y^2$$

$$8x^4 - 10x^2y - 3y^2$$

$$(2x^2 - 3y)(4x^2 + y)$$

$$2x^2 \cdot 4x^2 + 2x^2 \cdot y + -3y \cdot 4x^2 + -3y \cdot y$$

$$8x^4 + 2x^2y - 12x^2y - 3y^2$$

$$8x^4 - 10x^2y - 3y^2$$

$$(3x+5)^2 = (3x+5)(3x+5)$$

$$9x^2 + 15x + 15x + 25$$

$$(9x^2 + 30x + 25)$$

$$(9x + 8)(9x - 8)$$

$$81x^2 - \cancel{72x} - \cancel{72x} - 64$$

$$81x^2 - 64$$

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



Do the binomials first

(x^2-9) then finish

$$(x^2-9)(x^2-9) = x^4 - 9x^2 - 9x^2 + 81$$
$$\quad \quad \quad \underbrace{x^4 - 18x^2 + 81}$$

$$(x+4)(x-4)(x^2-16)$$

$$(x^2-16)(x^2-16)$$

$$x^4 - 16x^2 - 16x^2 + 256$$

$$x^4 - 32x^2 + 256$$

$$(x+4)(x-4)(x^2-16)$$

$$(x^2-16)(x^2-16)$$

$$x^4 - 16x^2 - 16x^2 + 256$$

$$x^4 - 32x^2 + 256$$

$$f(x) = x^2 + 5x + 2 \quad \text{find} \\ f(a+1)$$

$$f(x) = x^2 + 5x + 2 \quad \text{find } f(a+1)$$

$$f(a+1) = (a+1)^2 + 5(a+1) + 2$$

$$= (a+1)(a+1) + \underbrace{5a+5} + 2$$

$$a^2 + 2a + 1 + 5a + 7$$

$$a^2 + 7a + 8$$

