

4.5 MULTIPLICATION OF POLYNOMIALS

Ex. 1

$$\textcircled{a} \quad 2x^3 \cdot 3x^4 = 6x^7$$

$$\textcircled{b} \quad (-2ab^2)(-3ab^4) = 6a^2b^6$$

$$\textcircled{c} \quad (3a^2)^3 = (3a^2)(3a^2)(3a^2) \left. \vphantom{(3a^2)^3}} \right\} = 27a^6$$
$$\quad \quad \quad = 3^3 a^{2 \cdot 3}$$

Ex. 2

$$\textcircled{a} \quad 3x^2(x^3 - 4x) = 3x^5 - 12x^3$$

$$\textcircled{b} \quad (y^2 - 3y + 4)(-2y) = \\ -2y^3 + 6y^2 - 8y$$

$$\textcircled{c} \quad -a(b - c) = ac - ab \\ -ab + ac$$

Ex. 3

(a)

$$(x+2)(x+5) = x^2 + 5x + 2x + 10 \\ = x^2 + 7x + 10$$

(b)

$$(x+3)(x^2+2x-7) \\ x^3 + 2x^2 - 7x + 3x^2 + 6x - 21 \\ x^3 + 5x^2 - x - 21$$

ADDITIVE INVERSE

IF $x + y = 0$, THEN x & y ARE
ADDITIVE INVERSES OF EACH OTHER.

$$x = -y$$

Ex. 4

$$\begin{aligned} \textcircled{a} \quad & -(x-2) \\ & -x+2 \\ & 2-x \end{aligned}$$

$$\begin{aligned} \textcircled{b} \quad & -(9-y^2) \\ & -9+y^2 \\ & y^2-9 \end{aligned}$$

$$\textcircled{c} \quad -(a+4)$$

$$-a-4$$

$$(y^2-9) + (9-y^2) = 0$$

$$\textcircled{d} \quad \begin{aligned} & -(-x^2+6x-3) \\ & x^2-6x+3 \end{aligned}$$

4.6 MULTIPLYING BINOMIALS (FOIL)

Ex. 1

$$\begin{array}{cccc} & F & O & I & L \\ \textcircled{a} & (x+2)(x-4) & = & x^2 - 4x + 2x - 8 \\ & & & x^2 - 2x - 8 \end{array}$$

$$\textcircled{b} (2x+5)(3x-4) = 6x^2 + 7x - 20$$

$$\textcircled{c} (a-b)(2a-b) = 2a^2 - 3ab + b^2$$

$$\textcircled{d} (x+3)(y+5) = xy + 5x + 3y + 15$$

Ex. 2

$$\textcircled{a} (x^3 - 3)(x^3 + 6) = x^6 + 3x^3 - 18$$

$$\textcircled{b} (2a^2 + 1)(a^2 + 5) = 2a^4 + 10a^2 + a^2 + 5$$
$$2a^4 + 11a^2 + 5$$

Ex. 4

$$\textcircled{a} (b-1)(b+2)(b-3)$$

$$(b^2 + 2b - b - 2)(b-3)$$

$$(b^2 + b - 2)(b-3)$$

$$b^3 - 3b^2 + b^2 - 3b - 2b + 6$$

$$b^3 - 2b^2 - 5b + 6$$

$$\textcircled{b} \left(\frac{1}{2}x + 3\right)\left(\frac{1}{2}x - 3\right)(2x + 5)$$

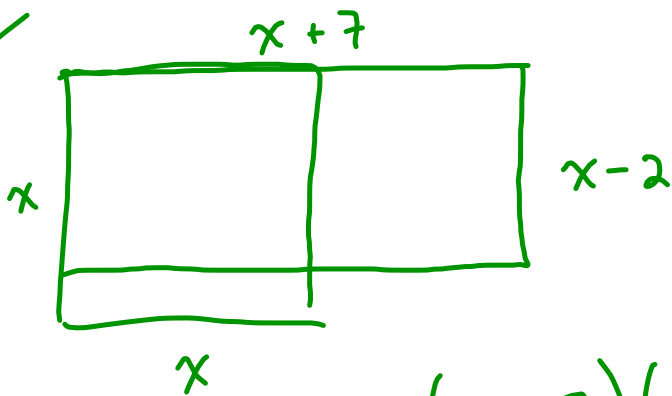
$$\frac{1}{4}x^2 - 9$$

$$\left(\frac{1}{4}x^2 - 9\right)(2x + 5)$$

$$\frac{1}{2}x^3 + \frac{5}{4}x^2 - 18x - 45$$

f 0 I L

Ex. 5



$$A = (x + 7)(x - 2)$$
$$= x^2 + 5x - 14$$

4.7 SPECIAL PRODUCTS

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

$$(a+b)(a-b) = a^2 - b^2$$

Ex. 1

$$\textcircled{a} (x+3)^2 = x^2 + 6x + 9$$

$$\textcircled{b} (2a+5)^2 = 4a^2 + 20a + 25$$

Ex. 2

$$\textcircled{a} (x-4)^2 = x^2 - 8x + 16$$

$$\textcircled{b} (4b-5y)^2 = \underline{16b^2} - 40by + 25y^2$$

$$\Rightarrow \underline{2(4b)(-5y)} \quad \underline{(4b)^2} + 2(4b)(-5y) + \underline{(-5y)^2}$$

Ex. 3

$$\textcircled{a} (x+2)(x-2) = x^2 - 4$$

$$\textcircled{b} (b+7)(b-7) = b^2 - 49$$

$$\textcircled{c} (3x-5)(3x+5) = 9x^2 - 25$$

Ex. 4

$$\textcircled{a} \quad (x+4)^3 = (x+4)(x+4)(x+4)$$

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

$$(x^2 + 8x + 16)(x+4)$$

$$x^3 + \underbrace{4x^2 + 8x^2}_{12x^2} + \underbrace{32x + 16x}_{48x} + 64$$

$$x^3 + 12x^2 + 48x + 64$$

$$\textcircled{b} \quad (y-2)^4$$

$$(y-2)^2 (y-2)^2$$

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

$$y^4 - 4y^3 + 4y^2 - 4y^3 + 16y^2 - 16y + 4y^2 - 16y + 16$$

$$y^4 - 8y^3 + 24y^2 - 32y + 16$$