

## Lesson 5: Simplifying Polynomial Expressions

EXAMPLES: Expand & Simplify

$$\begin{aligned} \text{a) } & 2x^2(3x^2 + 5x - 4) \\ & = 6x^4 + 10x^3 - 8x^2 \end{aligned}$$

$$\begin{aligned} \text{b) } & \frac{6x^3 + 10x^2y - 8x^2}{2} \\ & = 3x + 5y - 4 \end{aligned}$$

$$\begin{aligned} \text{c) } & -(a^3 - 2a^4) - a^3(a+1) + 2(3a^3) \\ & = -a^3 + 2a^4 - a^4 - a^3 + 6a^3 \\ & = 4a^3 + a^4 \end{aligned}$$

$$\begin{aligned} \text{d) } & 5x(3x + y) - 2x[3x - (4x + 2)] \\ & = 15x^2 + 5xy - 2x[3x - 4x - 2] \\ & = 15x^2 + 5xy - 6x^2 + 8x^2 + 4x \\ & = 17x^2 + 5xy + 4x \end{aligned}$$



## Lesson 6: Simplifying Polynomials 2

### 1) MULTIPLYING BINOMIALS

Multiply every term in the 1st binomial by every term in the second

F O I L  
i a n a  
r t s s  
s s i t  
t i d  
d e  
e

Ex. Expand & Simplify

$$\begin{aligned} \text{a) } & (n+2)(n-3) \\ & = n^2 - 3n + 2n - 6 \\ & = n^2 - n - 6 \end{aligned}$$

$$\begin{aligned} \text{b) } & (5m+2n)^2 \\ & = (5m+2n)(5m+2n) \\ & = 25m^2 + 10mn + 10mn + 4n^2 \\ & = 25m^2 + 20mn + 4n^2 \end{aligned}$$

### 2) MORE CHALLENGING

Ex. Expand & Simplify

$$\begin{aligned} \text{a) } & -3x(x^2-3)(5-2x^2) \\ & = (-3x^3+9x)(5-2x^2) \\ & = -15x^3 + 6x^5 + 45x - 18x^3 \\ & = -33x^3 + 6x^5 + 45x \end{aligned}$$

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

$$= -6x - 5x^2 - (2+x)(2+x) + (5x^4 + 15x^3 - 25x + 2x^3 + 6x^2 - 10)$$

$$= -6x - 5x^2 - (4 + 2x + 2x + x^2) + 5x^4 + 15x^3 - 25x + 2x^3 + 6x^2 - 10$$

$$= -6x - 5x^2 - 4 - 2x - 2x - x^2 + 5x^4 + 17x^3 - 25x + 6x^2 - 10$$

$$= -35x - 14 + 5x^4 + 17x^3$$