

To add or subtract polynomials...  
Combine like terms.

↳ same variable AND same exponent

$3x^2$        $4y$        $5x$        $2x^2$        $-2y^2$   
 (brackets under  $3x^2$  and  $2x^2$ )

like terms       $-x^2 + 8x^2 = 7x^2$

$ex$   $(3x^5 + 2x^3 - x^2 + 4) + (x^4 - 5x^3 + 8x^2 - 2x + 1)$   
 (brackets and arrows showing like terms:  $3x^5$ ,  $2x^3$ ,  $-x^2$ ,  $4$  and  $x^4$ ,  $-5x^3$ ,  $8x^2$ ,  $-2x$ ,  $1$ )  
 $2x^3 - 5x^3 = -3x^3$        $4 + 1 = 5$   
 $3x^5 - 3x^3 + 7x^2 + 5 + x^4 - 2x$

$3x^5 + x^4 - 3x^3 + 7x^2 - 2x + 5$

$ex$   $(4x^2 - 6x + 3) - (3x^2 + 5x - 8)$   
 $+ -3x^2 - 5x + 8$

$(4x^2 - 6x + 3) - (3x^2 + 5x - 8)$   
 (arrows showing subtraction of terms)

$4x^2 - 3x^2 = 1x^2$

$-6x - 5x = -11x$

$3 - (-8) = 11$

$x^2 - 11x + 11$

To multiply polynomials ...  
we must apply FOIL.

ex

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

FOIL steps:

- F:  $2x \cdot x = 2x^2$
- O:  $2x \cdot (-4) = -8x$
- I:  $3 \cdot x = 3x$
- L:  $3 \cdot (-4) = -12$

Combine like terms:  $-8x + 3x = -5x$

$$2x^2 - 5x - 12$$

To divide polynomials ...  
apply properties of exponents.

ex

$$\frac{6x^3}{14x^2} = \frac{3x}{7}$$

Exponent property:  $x^{3-2} = x^1$

$$\frac{24x^4y^2}{10x^6y} = \frac{12y}{5x^2}$$

Exponent properties:  $x^{4-6} = x^{-2}$