

# Warm-ups



1.  $\frac{\sqrt{2}}{\sqrt{10}}$

2.  $\frac{\sqrt{3}}{4\sqrt{12}}$

3.  $\frac{3\sqrt{8}}{\sqrt{4}}$

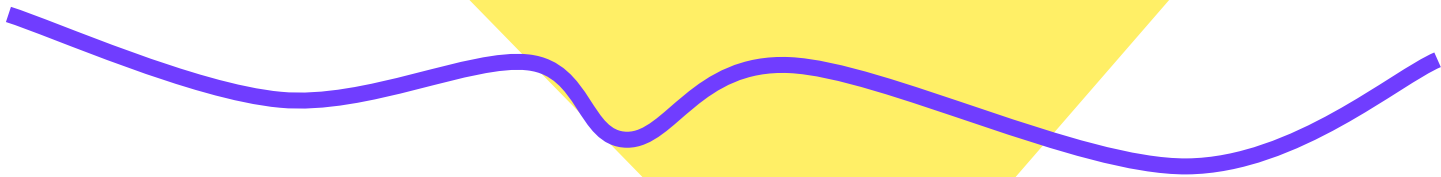
4.  $\frac{5}{4\sqrt{2}}$

1.  $\frac{\sqrt{5}}{5}$

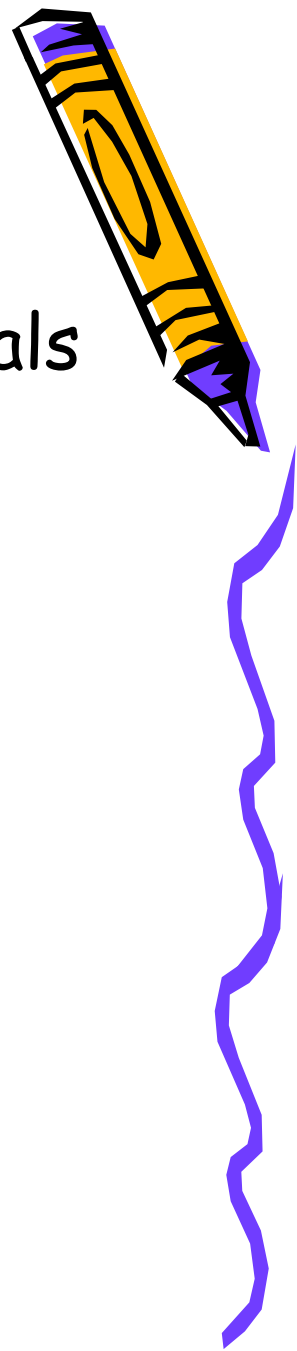
2.  $\frac{1}{8}$

3.  $3\sqrt{2}$

4.  $\frac{5\sqrt{2}}{8}$



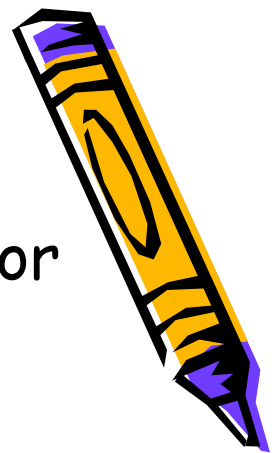
# P4 Polynomials



- Understand the vocabulary of polynomials
- Add and subtract polynomials
- Multiply polynomials
- Use FOIL in polynomial multiplication
- Use special products in polynomial multiplication
- Perform operations with polynomials in several variables



# Vocabulary



- Polynomial is a single term or the sum of two or more terms containing numbers and variables
- Standard form is a polynomial written in descending order of powers
- Degree of a polynomial is the greatest of the degrees of all its terms
- Monomial has only one term
- Binomial has exactly two terms
- Trinomial has exactly three terms
- Like terms are terms with the same variables with the exact same power



Coefficient is the numerical factor of a term



# Adding & Subtracting Polynomials

- Identify any like terms
- Add or subtract the coefficients of the like terms by regrouping or using columns

Example 1:

a.  $(-9x^3 + 7x^2 - 5x + 3) + (13x^3 + 2x^2 - 8x - 6)$

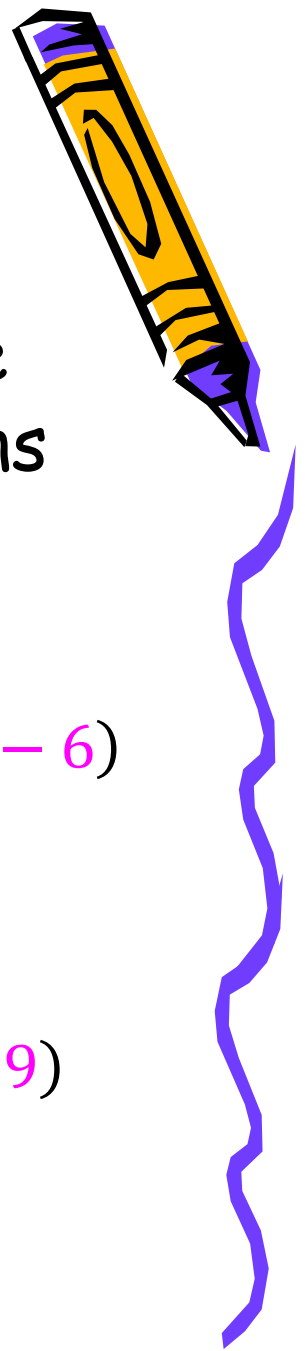
$$(-9x^3 + 13x^3) + (7x^2 + 2x^2) + (-5x - 8x) + (3 - 6)$$

$$4x^3 + 9x^2 - 13x - 3$$

b.  $(7x^3 - 8x^2 + 9x - 6) - (2x^3 - 6x^2 - 3x + 9)$

$$(7x^3 - 2x^3) + (-8x^2 + 6x^2) + (9x + 3x) + (-6 - 9)$$

$$5x^3 - 2x^2 + 12x - 15$$



# Multiplying Polynomials



- Multiply each term of one polynomial by each term of the other polynomial. Then combine like terms.

Example 2:

$$(2x + 3)(x^2 + 4x + 5)$$

$$(2x)(x^2 + 4x + 5) + (3)(x^2 + 4x + 5)$$

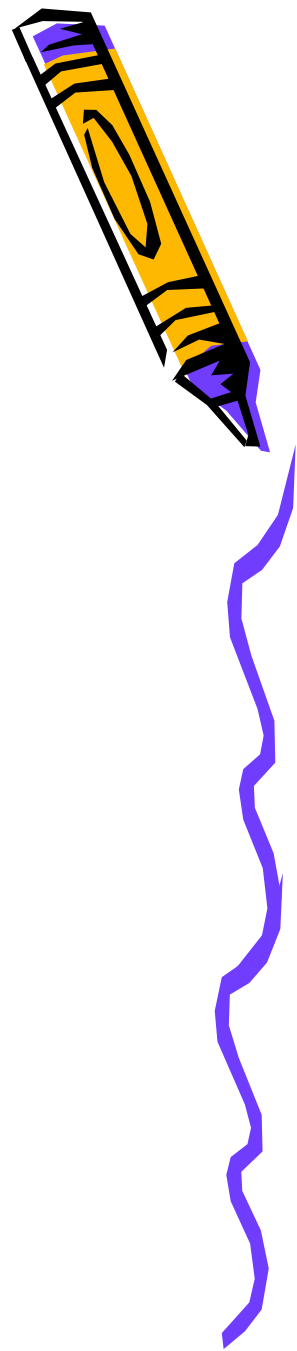
$$2x^3 + 8x^2 + 10x + 3x^2 + 12x + 15$$

$$2x^3 + (8x^2 + 3x^2) + (10x + 12x) + 15$$

$$2x^3 + 11x^2 + 22x + 15$$



# Multiplying two binomials



- FOIL Method
  - First times First
  - Outer times Outer
  - Inner times Inner
  - Last times Last

Example 3:

$$(3x + 4)(5x - 3)$$

$$(3x \cdot 5x) + (3x \cdot -3) + (4 \cdot 5x) + (4 \cdot -3)$$

$$15x^2 - 9x + 20x - 12$$

$$15x^2 + 11x - 12$$



# Multiplying binomials

Example 4:

a.  $(4y + 3)(4y - 3)$

$$(4y \cdot 4y) + (4y \cdot -3) + (3 \cdot 4y) + (3 \cdot -3)$$

$$16y^2 - 12x + 12x - 9$$

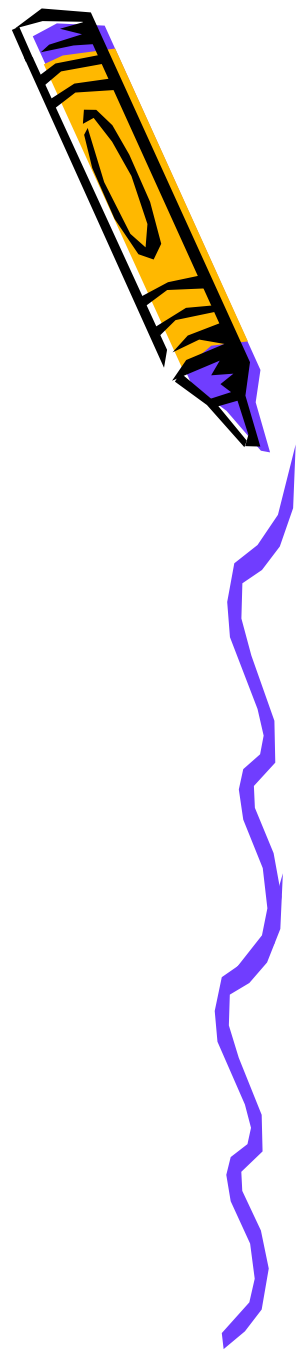
$$16y^2 - 9$$

b.  $(5a^4 + 6)(5a^4 - 6)$

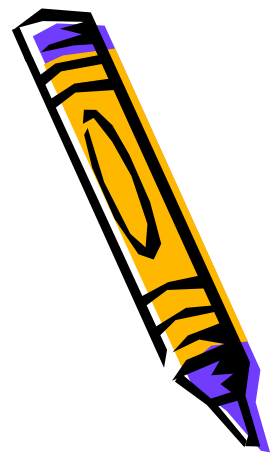
$$(5a^4 \cdot 5a^4) + (5a^4 \cdot -6) + (6 \cdot 5a^4) + (6 \cdot -6)$$

$$25a^8 - 30a^4 + 30a^4 - 36$$

$$25a^8 - 36$$



# Multiplying binomials



Example 5:

a.  $(x + 3)^2$

$$(x + 3)(x + 3)$$

$$(x \cdot x) + (x \cdot 3) + (3 \cdot x) + (3 \cdot 3)$$

$$x^2 + 3x + 3x + 9$$

$$x^2 + 6x + 9$$

b.  $(3x + 7)^2$

$$(3x + 7)(3x + 7)$$

$$(3x \cdot 3x) + (3x \cdot 7) + (7 \cdot 3x) + (7 \cdot 7)$$

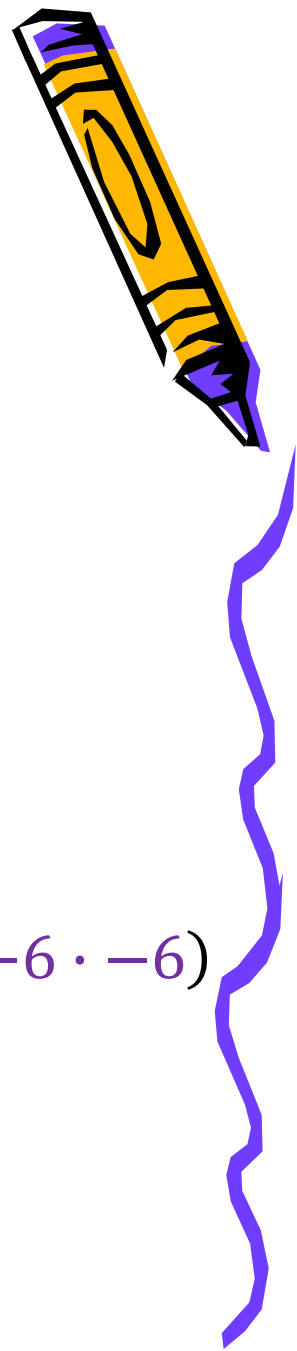
$$9x^2 + 21x + 21x + 49$$

$$9x^2 + 42x + 49$$





# Multiplying binomials



Example 6:

a.  $(x - 4)^2$

$$(x - 4)(x - 4)$$

$$(x \cdot x) + (x \cdot -4) + (-4 \cdot x) + (-4 \cdot -4)$$

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

$$x^2 - 8x + 16$$

b.  $(5y - 6)^2$

$$(5y - 6)(5y - 6)$$

$$(5y \cdot 5y) + (5y \cdot -6) + (5y \cdot -6) + (-6 \cdot -6)$$

$$25y^2 - 30y - 30y + 36$$

$$25y^2 - 60y + 36$$

