SECTION 5-2: POLYNOMIALS

By the end of the lesson, you will be able to:

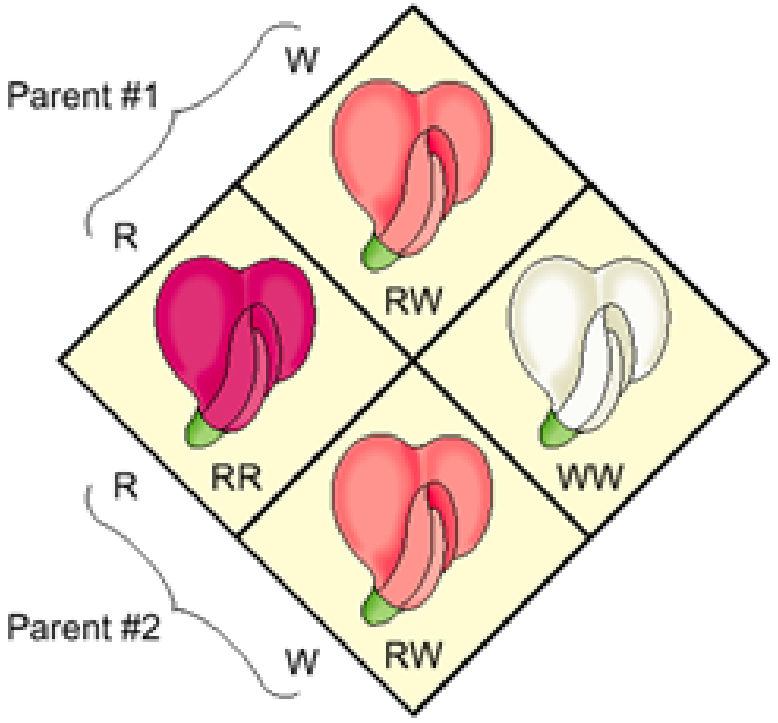
~ Simplify polynomials

SECTION 5-2: POLYNOMIALS

SCIENTISTS CAN USE ALGEBRAIC EXPRESSIONS TO SUMMARIZE THE POSSIBLE OUTCOMES IN GENETIC BREEDING. CERTAIN TRAITS RESULT FROM THE PAIRING OF TWO GENES, ONE FROM THE FEMALE PARENT AND ONE FROM THE MALE PARENT.

FOR EXAMPLE, SUPPOSE A RED-FLOWERING, SWEET PEA PLANT HAS GENOTYPE RR, A WHITE-FLOWERING, SWEET PEA PLANT HAS GENOTYPE WW, AND A PINK-FLOWERING, SWEET PEA PLANT HAS GENOTYPE RW. EACH LETTER REPRESENTS ONE OF THE TWO GENES THAT MAKE UP THE CHARACTERISTICS.

SUPPOSE TWO PINK-FLOWERING PLANTS ARE BRED. THE OFFSPRING CAN BE EXPRESSED USING ALGEBRA AND A MODEL CALLED A PUNNETT SQUARE.

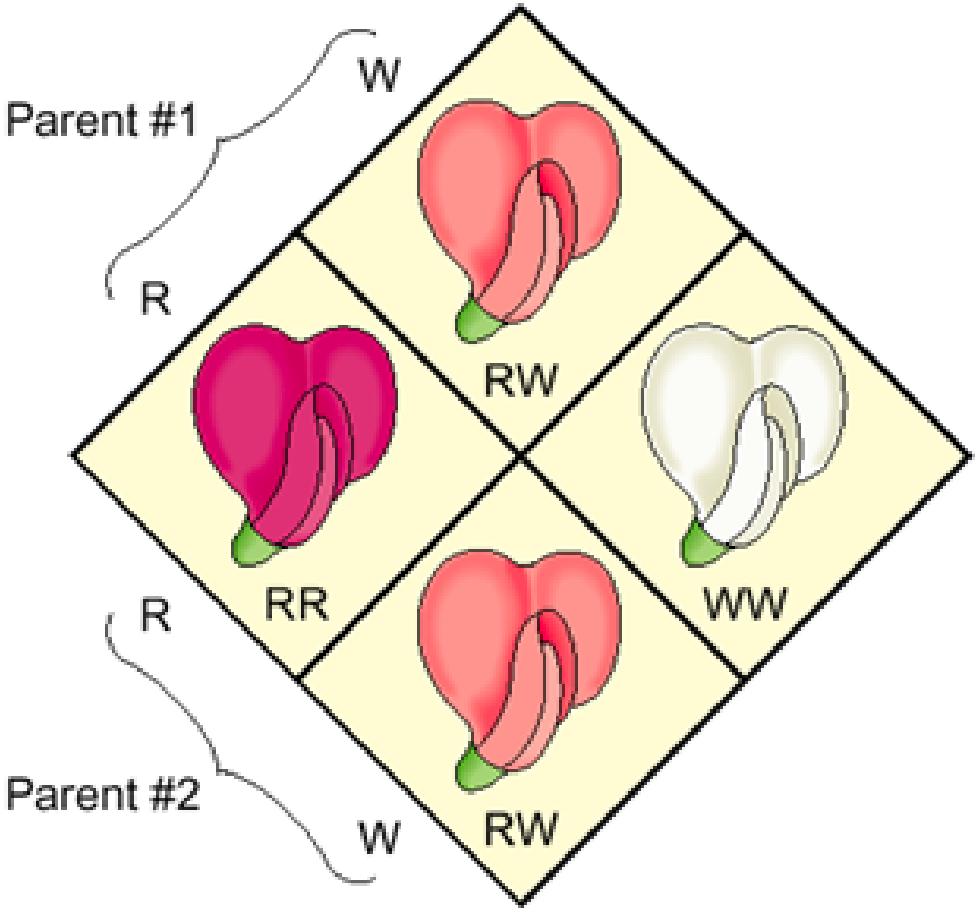


Section 5-2: Polynomials

The sum of the possible results for four offspring can be written as RR + RW + RW + WW. The result would be a sum of four *monomials*, which can be written as

The reason RW + RW can be combined as 2W is because they are like terms.

The expression $R^2 + 2RW + W^2$ is known as a polynomial.



SECTION 5-2: POLYNOMIALS

SOME IMPORTANT DEFINITIONS

~ A **POLYNOMIAL** IS A MONOMIAL OR A SUM OF MONOMIALS. (IT CAN'T HAVE "ROOTS".)

EX: $2X + 3Y - 4XY$

~ THE MONOMIALS OF A POLYNOMIAL ARE CALLED THE **TERMS** OF THE POLYNOMIAL.

EX: $2X + 3Y + 4XY$ HAS 3 TERMS: $2X$, $3Y$, AND $4XY$ (parts)

~ A POLYNOMIAL WITH 3 TERMS (UNLIKE TERMS-CANNOT BE COMBINED) IS KNOWN AS A **TRINOMIAL**.

EX: $6Z + 7W + 3ZWY$ IS A TRINOMIAL

~ A POLYNOMIAL WITH 2 TERMS (UNLIKE) IS A **BINOMIAL**.

EX: $X - 6TY$ IS A BINOMIAL

SECTION 5-2: POLYNOMIALS

SOME IMPORTANT DEFINITIONS

DEGREE OF A MONOMIAL: THE SUM OF ALL THE EXPONENTS OF ALL THE VARIABLES.

ex: $3x^2y^4$ → Degree: 6

DEGREE OF A POLYNOMIAL: EQUALS THE DEGREE OF THE TERM WITH THE GREATEST DEGREE.

ex: $3x^2y^4 - 4x^3y^7 + 2xy$

D: 6 D: 10 D: 2

Degree: 10

POLYNOMIALS

examples:

STATE WHAT TYPE OF POLYNOMIAL AND THE DEGREE

	Type	Degree
a. $\frac{2}{7}x^4y^3 - 21x^3$ (7, 3)	Binomial	7
B. $\sqrt{x} - 3$	Not a polynomial	—
C. x^2	monomial	2
D. $x^2 - 3x^3 + 2x$ (2, 3, 1)	trinomial	3

SECTION 5-2: POLYNOMIALS

SIMPLIFYING POLYNOMIALS

WHEN SIMPLIFYING POLYNOMIALS, COMBINE ALL LIKE TERMS.

EXAMPLES: SIMPLIFY.

1. $(4x^2 - 3x) - (x^2 + 2x - 1)$

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

$= \boxed{3x^2 - 5x + 1}$

2. $(2x^2 - 3xy + 5y^2) - (4x^2 - 3xy - 2y^2)$

$= 2x^2 - 3xy + 5y^2 - 4x^2 + 3xy + 2y^2$

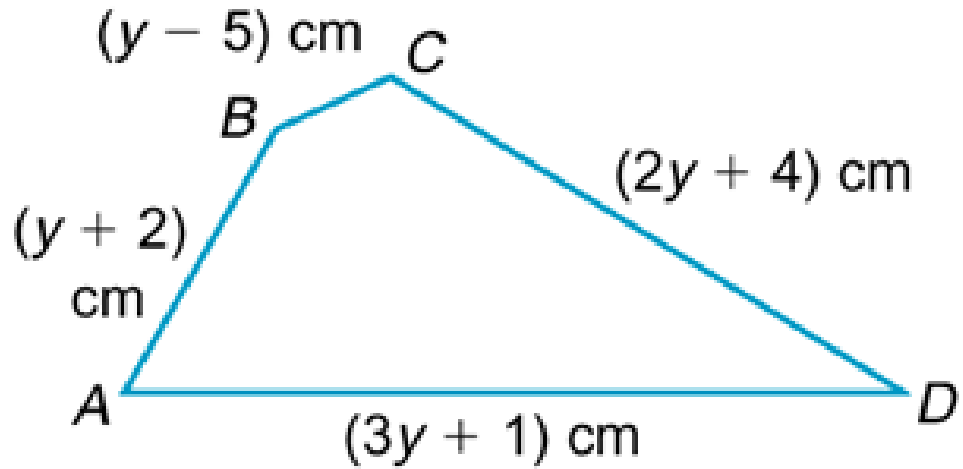
$= \boxed{-2x^2 + 7y^2}$

SECTION 5-2: POLYNOMIALS

SIMPLIFYING POLYNOMIALS

FIND THE PERIMETER OF THE QUADRILATERAL

add the sides



$P = (y-5) + (2y+4) + (3y+1) + (y+2)$

$P = y - 5 + 2y + 4 + 3y + 1 + y + 2$

$P = 7y + 2$ cm

SECTION 5-2: POLYNOMIALS

MULTIPLYING POLYNOMIALS

USE THE DISTRIBUTIVE PROPERTY TO MULTIPLY POLYNOMIALS.

EXAMPLE 4: SIMPLIFY

$$3x\,(5x^4 - x^3 + 4x)$$

$$= 15x^5 - 3x^4 + 12x^2$$

SECTION 5-2: POLYNOMIALS

MULTIPLYING POLYNOMIALS

USE THE DISTRIBUTIVE PROPERTY TO MULTIPLY POLYNOMIALS.

EXAMPLE 5: SIMPLIFY

$$9a^2(3a - 7b^3)$$

$$= 27a^3 - 63a^2b^3$$

SECTION 5-2: POLYNOMIALS

MULTIPLYING POLYNOMIALS

WHEN MULTIPLYING 2 BINOMIALS, THE FOIL METHOD CAN BE USED.

THE FOIL METHOD IS AN APPLICATION OF THE DISTRIBUTION PROPERTY THAT MAKES MULTIPLICATION EASIER.

The product of two binomials is the sum of the products of

F	**the *first* terms,**
O	**the *outer* terms,**
I	**the *inner* terms, and**
L	**the *last* terms.**

SECTION 5-2: POLYNOMIALS

MULTIPLYING POLYNOMIALS

The product of two binomials is the sum of the products of

F	**the *first* terms,**
O	**the *outer* terms,**
I	**the *inner* terms, and**
L	**the *last* terms.**

example 6: use the foil method (for distribution) to find the product.

$(x+8)(x+12)$

$= x^2 + 12x + 8x + 96$

$= \boxed{x^2 + 20x + 96}$

MULTIPLYING POLYNOMIALS

example 7: FIND THE PRODUCT.

$$(4n+3)(3n+1)$$

$$= 12n^2 + 4n + 9n + 3$$

$$= \boxed{12n^2 + 13n + 3}$$

MULTIPLYING POLYNOMIALS

EXAMPLE 8: FIND THE PRODUCT.

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

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

$= \boxed{x^2+6x+9}$

SECTION 5-2: POLYNOMIALS

MULTIPLYING POLYNOMIALS

EXAMPLE 9: FIND THE PRODUCT.

$$x^{-4}(x^6 - 2x^4 + x^{-2})$$

$$= x^{-4} \cdot x^6 - 2x^4 \cdot x^{-4} + x^{-2} x^{-4}$$

$$= x^2 - 2x^0 + x^{-6}$$

$$= \boxed{x^2 - 2 + \frac{1}{x^6}}$$

SECTION 5-2: POLYNOMIALS

MULTIPLYING POLYNOMIALS

EXAMPLE 10: FIND THE PRODUCT.

$$(3y^2 - 2)(-2y + 1)$$

$$= -6y^3 + 3y^2 + 4y - 2$$

SECTION 5-2: POLYNOMIALS

MULTIPLYING POLYNOMIALS

EXAMPLE 11: FIND THE PRODUCT.

$$(3 - q)(3 + q)$$

$$= 9 + 3q - 3q - q^2$$

$$= \boxed{9 - q^2}$$

HOMEWORK:

REVIEW FOR TEST 4

&

ASSIGNMENT 17

DUE AT BEGINNING OF CLASS AFTER TEST