Name: Notes Date: 4/18/14 GPA 14-4, 14-5

14-4, 14-5 Multiplying Polynomials

***Remember:**

1. When we are multiplying integers, variables, or other terms, if they have

Different signs → answer is negative Same signs → answer is positive

$9 * -2 =$ -18 $-9 * -2 =$ 18

2. When we multiply terms with exponents, we **add** the exponents of the like terms. (must have the same base)

$a^5 * a^4 =$ a^9 $b^7 * b^{-2} =$ b^5 Ex: $x^2 \cdot x^3$

5+4=9 7+(-2)

Ex. 1: Multiply using Distributive Property. Then, simplify if needed.

A. $(9x^5y^7)(-2x^4y^4)$

$(9 \cdot -2)(x^5 \cdot x^4)(y^7 \cdot y^4)$

$\boxed{-18x^9y^{11}}$

① Multiply coefficients
② Multiply 1st variable
③ Multiply 2nd variable

B. $(-4x^3y^2)(-7x^5y^3)$

$(-4 \cdot -7)(x^3 \cdot x^5)(y^2 \cdot y^3)$

$\boxed{28x^8y^5}$

C. $3(5x + 2y^2)$ *use distributive property

$3 \cdot 5x + 3 \cdot 2y^2$

$\boxed{15x + 6y^2}$

D. $8y(5x^2 - 2y)$

$8y \cdot 5x^2 - 8y \cdot 2y$

$\boxed{40x^2y - 16y^2}$

Note:
1) List variables in alphabetical order
2) Greatest exponents first

E. $-7x^9y^4(6x^3y + x^2 - 4xy^5 - 8)$

$(-7x^9y^4 \cdot 6x^3y) + (-7x^9y^4 \cdot x^2) + (-7x^9y^4 \cdot -4xy^5) + (-7x^9y^4 \cdot -8)$

$\boxed{42x^{12}y^5 - 7x^{11}y^4 + 28x^{10}y^9 + 56x^9y^4}$

F. $-4x^2y^3(-5xy^4 + 3x^4) - x^3y^7 + 8$ *combine like terms

$20x^3y^7 - 12x^6y^3 - x^3y^7 + 8$

$\boxed{19x^3y^7 - 12x^6y^3 + 8}$

When multiplying a binomial by a binomial, we still use the distributive property. However, we have a method that helps us keep our work organized called the

FOIL method.

F → first
O → outer
I → inner
L → last

$(x + 4)(x - 1)$

$(x)(x) + (x)(-1) + (4)(x) + (4)(-1)$

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

$\boxed{x^2 + 3x - 4}$

Ex. 2: Multiply using the foil method.

A. $(x + 3)(x + 2)$

$(x)(x) + (x)(2) + (3)(x) + (3)(2)$

$x^2 + 2x + 3x + 6$

$\boxed{x^2 + 5x + 6}$

B. $(2y + 1)(5y + 3)$

$10y^2 + 6y + 5y + 3$

$\boxed{10y^2 + 11y + 3}$

C. $(7m + 2)(3m - 8)$

$21m^2 - 56m + 6m - 16$

$\boxed{21m^2 - 50m - 16}$

D. $(3c - 5a)(2c + 4d)$

$\boxed{6c^2 + 12cd - 10ac - 20ad}$

E. $(a - 2)(b - 8)$

$\boxed{ab - 8a - 2b + 16}$

Special Products:

1. $(a+b)^2 = (a+b)(a+b)$

$a^2 + ab + ab + b^2$

$\boxed{a^2 + 2ab + b^2}$

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

$a^2 - ab - ab + b^2$

$\boxed{a^2 - 2ab + b^2}$

PERFECT SQUARE TRINOMIALS

3. $(a+b)(a-b)$

$a^2 \underbrace{-ab + ab}_{\text{zero pair}} - b^2$

$\boxed{a^2 - b^2}$

DIFFERENCE OF TWO SQUARES

Ex. 3: Multiply using the foil method and the trick using the pattern with the special products.

A. $(x+3)^2$

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

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

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

B. $(y-4)^2$

$(y-4)(y-4)$

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

$\boxed{y^2 - 8y + 16}$

C. $(x+7)(x-7)$

$x^2 - 7x + 7x - 49$

$\boxed{x^2 - 49}$

★ Compare with:

$(x-3)^2$

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

$(y-4)^2$

$\boxed{y^2 - 8y + 16}$

$(x+7)(x-7)$

$\boxed{x^2 - 49}$

1st term squared
2 x 1st term x 2nd term
2nd term squared
} Perfect Square Trinomials

Difference of Two Squares { 1st term squared minus 2nd term squared

HW: 14-4 Worksheet, Labor Relations Worksheet