Intro to College Math: Chapter 5.5
Multiplying Polynomials

* FOIL Method — first, outside, inside, last.

* Hint: $x \cdot x = x^2$

exp.) $(2x+3)(5x-4)$

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

first, outside, inside, last

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

$10x^2 + 7x - 12$

1. Multiply. $-10(x-2)$

$-10(x-2)$

$-10 \cdot x + (-10)(-2)$

$-10x + 20$

* multiply the term outside the ( ) by each term inside the ( )

2. Multiply the following by applying the distributive property. $2b(6b-4)$

$2b(6b-4)$

$2b \cdot 6b + (2b) \cdot (-4)$

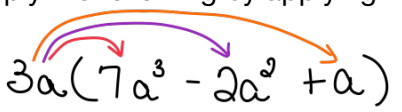
$2 \cdot 6 \cdot b \cdot b + 2 \cdot (-4) \cdot b$

$12b^2 - 8b$

* multiply the term outside the ( ) by each term inside the ( )

* Hint: $b \cdot b = b^2$

3. Multiply the following by applying the distributive property. $3a(7a^3 - 2a^2 + a)$



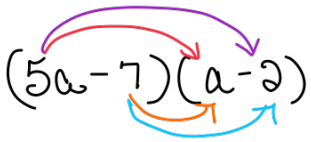
$3a \cdot 7a^3 + 3a(-2a^2) + 3a \cdot a$

$21a^4 - 6a^3 + 3a^2$

* multiply the term outside the ( ) by each term inside the ( )

Hint: when multiplying like variables, add their exponents. (If no exponent shown, then it is 1.)

4. Multiply the following binomials. $(5a - 7)(a - 2)$



$5a \cdot a + 5a \cdot (-2) + (-7) \cdot a + (-7)(-2)$

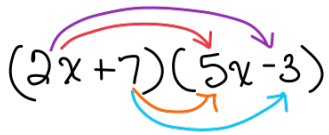
$5a^2 - 10a - 7a + 14$

$5a^2 - 17a + 14$

Foil Method:

1. Multiply 1st term in the 1st set of ( ) by both terms in 2nd set of ( ).
2. Multiply the 2nd term in the 1st set of ( ) by both terms in the 2nd set of ( ).
3. Combine like terms.

5. Multiply the following binomials. $(2x + 7)(5x - 3)$



$(2x)(5x) + (2x)(-3) + (7)(5x) + (7)(-3)$

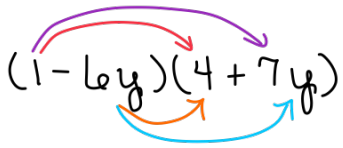
$10x^2 - 6x + 35x - 21$

$10x^2 + 29x - 21$

Foil Method:

1. Multiply 1st term in the 1st set of ( ) by both terms in 2nd set of ( ).
2. Multiply the 2nd term in the 1st set of ( ) by both terms in the 2nd set of ( ).
3. Combine like terms.

6. Multiply the following binomials. $(1-6y)(4+7y)$



$1 \cdot 4 + (1)(7y) + (-6y)(4) + (-6y)(7y)$

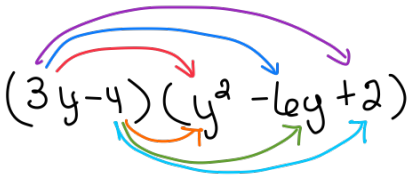
$4 + 7y - 24y - 42y^2$

$4 - 17y - 42y^2$

Foil Method:

1. Multiply 1st term in the 1st set of ( ) by both terms in 2nd set of ( ).
2. Multiply the 2nd term in the 1st set of ( ) by both terms in the 2nd set of ( ).
3. Combine like terms.

7. Multiply the following polynomials. $(3y-4)(y^2-6y+2)$



$(3y)(y^2) + (3y)(-6y) + (3y)(2) + (-4)(y^2) + (-4)(-6y) + (-4)(2)$

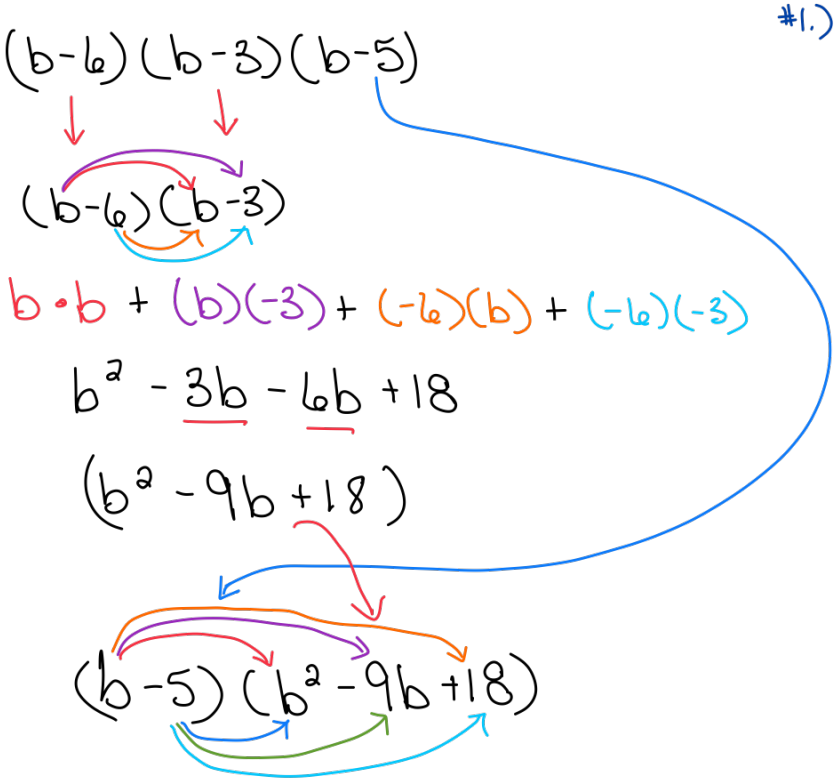
$3y^3 - 18y^2 + 6y - 4y^2 + 24y - 8$

$3y^3 - 22y^2 + 30y - 8$

Foil Method:

1. Multiply 1st term in the 1st set of ( ) by all 3 terms in 2nd set of ( ).
2. Multiply the 2nd term in the 1st set of ( ) by all 3 terms in the 2nd set of ( ).
3. Combine like terms.

8. Multiply. $(b-6)(b-3)(b-5)$



$(b)(b^2) + (b)(-9b) + (b)(18) + (-5)(b^2) + (-5)(-9b) + (-5)(18)$

$b^3 - 9b^2 + 18b - 5b^2 + 45b - 90$

$b^3 - 14b^2 + 63b - 90$

#1.) Use foil method on 1st 2 sets of ( )

Foil Method:

1. Multiply 1st term in the 1st set of ( ) by all 3 terms in 2nd set of ( ).
2. Multiply the 2nd term in the 1st set of ( ) by all 3 terms in the 2nd set of ( ).
3. Combine like terms.

#2.) Bring down the 3rd set of ( ) from original problem and multiply it by the expression you just found.

Foil Method:

1. Multiply 1st term in the 1st set of ( ) by all 3 terms in 2nd set of ( ).
2. Multiply the 2nd term in the 1st set of ( ) by all 3 terms in the 2nd set of ( ).
3. Combine like terms.