MFM2PI – *Unit 6: Quadratic Expressions – Lesson 1*  Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Binomial Expansion: Revenge of the Distributive Property!**

1. **The Terminology of Algebra**

In this unit, we will be working with algebra again, so let’s take a quick moment to refresh the terminology!  
Match the vocabulary with its correct definition.

|  |  |
| --- | --- |
| **Monomial** | * an algebraic expression with three terms |
| **Constant** | * a term without a variable |
| **Polynomial** | * an algebraic expression with many terms |
| **Variable** | * an algebraic expression with one term |
| **Binomial** | * a series of terms, each separated by addition or subtraction |
| **Algebraic Expression** | * a combination of numbers and variables, forming a product |
| **Term** | * a letter that stands in for a number |
| **Trinomial** | * an algebraic expression with two terms |

1. **Multiplying Monomials by Monomials**

As we move further into this unit and the next, the ability to multiply not only numbers but also variables will become very important! Let’s practice a little bit of variable multiplication together.

a) (z)(z) = \_\_\_\_\_\_ b) (y2)(y) =\_\_\_\_\_\_ c) (a3)(a2) = \_\_\_\_\_\_

d) (2g)(g2) = \_\_\_\_\_\_ e) (3e2)(2e) = \_\_\_\_\_\_ f) (2k2)(5k3) = \_\_\_\_\_\_

g) (3f)(3fg) = \_\_\_\_\_\_ h) (f2)(4fm3) = \_\_\_\_\_\_ i) (3b2c)(2bcd) = \_\_\_\_\_\_

1. **Multiplying Monomials by Binomials**

Multiplying a monomial by a binomial requires the use of the distributive property. In this context, the ***distributive property*** means multiplying the monomial by *each* term in the binomial. Don’t be afraid to draw some arrows to keep your multiplying straight! OK – let’s try some together!

a) x(x + 2) = \_\_\_\_\_\_\_\_\_\_\_\_ b) 2(y + 2z) = \_\_\_\_\_\_\_\_\_\_\_\_ c) p(3p – 5) = \_\_\_\_\_\_\_\_\_\_\_\_

d) 2b(a – b) = \_\_\_\_\_\_\_\_\_\_\_\_ e) 3r(r2 + 1) = \_\_\_\_\_\_\_\_\_\_\_\_ f) u2(u2 – u) = \_\_\_\_\_\_\_\_\_\_\_\_

g) 2mn(m + n) = \_\_\_\_\_\_\_\_\_\_\_\_ h) 5q(q3 – 2r) = \_\_\_\_\_\_\_\_\_\_\_\_ i) a3(2ab – c) = \_\_\_\_\_\_\_\_\_\_\_\_

***Quick Summary!*** When you multiply the same variable [for example, (\_\_\_)(\_\_\_\_)], you \_\_\_\_\_\_\_\_\_\_ the   
 exponents together to get your answer [in this example, (\_\_\_\_)]!

***Remember Binomial Expansion:***

F O I L

(x + 2) (x – 3)

**F**irst terms get multiplied  
**O**utside terms get multiplied  
**I**nside terms get multiplied  
**L**ast terms get multiplied

1. **Multiplying Binomials by Binomials**

Multiplying a binomial by a binomial requires even  
more involved use of the distributive property.   
Remember that, in this context, using the  
distributive property means that you must  
multiply *every term in the first* binomial by  
*every term in the second* binomial. To the right,

there is a handy phrase for remembering

specifically how binomial expansion works:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How To Multiply Two Binomials

1. Multiply each term in the first binomial by each term in the second binomial (don’t be afraid to draw arrows!)
2. Collect any “like” terms (recall that “like” terms have the same amount and type of variable)
3. Organize your remaining terms in descending order of degree (squared terms come before single variables, etc.)

Let’s try some examples together.

a) (x + 1)(x + 2) b) (y + 3)(y + 4)

c) (z + 2)(z – 4) d) (a – 3)(a – 4)

e) (2j + 1)(3j – 2) f) (3d – 4)(d – 2)

g) (h + 2)2 h) (r + 5)(r – 5)

**HW: *Unit 6 Lesson 1 Homework***