

Lesson Plan

Grade 10 Academic Math

Lesson: 2

Unit: Polynomials

Topic: Multiplying Binomials

✚ *homework check:* Principles of Mathematics 10 p. 194 # 1 – 3, # 7 and FM10 p. 60 # 1 – 4

✚ *note:* Multiplying Binomials

To multiply one binomial by another, we can use distributive property. There are two ways to use the distributive property which states that **each term in the first binomial multiplies by each term in the second binomial**.

We can use the distributive property exactly as it is laid out in its definition by:

$$\begin{aligned} a) \quad (x+2)(x+3) &= \text{distribute the } x \text{ and } 2 \text{ through the brackets} \\ &= x(x+3) + 2(x+3) \\ &= x^2 + 3x + 2x + 6 \quad \text{collect like terms} \\ &= x^2 + 5x + 6 \end{aligned}$$

$$\begin{aligned} b) \quad (2x+3)(x-2) &= \text{distribute the } 2x \text{ and } 3 \text{ through the brackets} \\ &= 2x(x-2) + 3(x-2) \\ &= 2x^2 - 4x + 3x - 6 \quad \text{collect like terms} \\ &= 2x^2 - x - 6 \end{aligned}$$

This use of the distributive property quickly establishes a multiplication pattern to follow each time we are asked to multiply two binomials. For instance, we distribute in a pattern that follows the word “FOIL” – first terms, outer terms, inner terms, and last terms of the brackets. For example,

$$\begin{aligned} c) \quad (x-3)(x+7) &= \\ &= x^2 + 7x - 3x - 21 \\ &= x^2 + 4x - 21 \end{aligned}$$

$$\begin{aligned} d) \quad (2x+3)^2 &= \text{use meaning of exponent to write brackets twice (squared)} \\ &= (2x+3)(2x+3) \\ &= 4x^2 + 6x + 6x + 9 \\ &= 4x^2 + 12x + 9 \end{aligned}$$

$$\begin{aligned}
 e) \quad & 3(x+2)(2x-3) = \\
 & = 3[2x^2 - 3x + 4x - 6] \\
 & = 3[2x^2 + x - 6] \\
 & = 6x^2 + 3x - 18
 \end{aligned}$$

method 2:

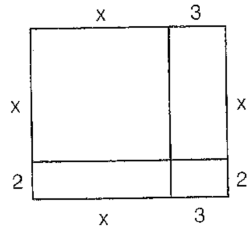
$$\begin{aligned}
 & = (3x+6)(2x-3) \\
 & = 6x^2 - 9x + 12x - 18 \\
 & = 6x^2 + 3x - 18
 \end{aligned}$$

It is very important to notice that BOTH METHODS use the distributive property correctly. You MUST CHOOSE ONE and USE IT CONSISTENTLY!

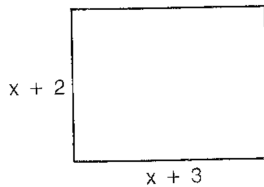
📌 homework assignment: FM 10 p. 62 # 2 – 4

EXERCISE 2.3

- A 1. (a) Determine the area of each of the smaller rectangles, then add them together.



- (b) Determine the area of the rectangle by expanding the binomials.



- B 2. Expand.

- | | |
|-----------------------|----------------------|
| (a) $(x + 1)(x + 2)$ | (b) $(x + 2)(x + 3)$ |
| (c) $(x + 4)(x + 2)$ | (d) $(x - 1)(x - 3)$ |
| (e) $(x - 3)(x + 5)$ | (f) $(x + 2)(x - 1)$ |
| (g) $(y - 5)(y - 4)$ | (h) $(t + 7)(t + 8)$ |
| (i) $(m - 4)(m + 9)$ | (j) $(n - 2)(n - 9)$ |
| (k) $(x + 8)(x - 7)$ | (l) $(y + 1)(y - 7)$ |
| (m) $(x + 7)(x + 6)$ | (n) $(t - 5)(t - 9)$ |
| (o) $(m - 6)(m - 11)$ | (p) $(w - 4)(w + 4)$ |

3. Expand and simplify.

- $(2x + 3)(x + 5)$
- $(3x + 4)(2x + 7)$
- $(7y - 2)(2y + 5)$
- $(2m - 5)(3m - 1)$
- $(4m - 3)^2$
- $(3x + 5)^2$
- $(2x - 5)(2x + 5)$
- $(4t + 7)(2t + 3)$
- $(5t - 6)^2$
- $(7t + 4)^2$
- $(3x - 2y)(4x - 3y)$
- $(5m + 2n)(4m - n)$
- $(3x + 5y)^2$
- $(3x + 7y)(4y - x)$
- $(7 - 8t)(7 + 8t)$
- $(4x - 9y)(2y + 7x)$
- $(9x + 10y)(8x + 3y)$
- $(7m - 5n)(8m + 3n)$
- $(3x^2 - 2x)(4x^2 - x)$
- $(4xy - x^2)(x^2 - xy)$
- $(2t^2 - 7)^2$
- $(x^4 - 3)(5x^4 - 6)$
- $(-2x + 3y)(4x - 7y)$

4. Expand and simplify.

- $2(x + 3)(x + 4) + 3(2x + 3)$
- $3(x + 1)(x + 2) + 2(x + 4)(x + 5)$
- $3(m - 2)(m - 3) - 4(m + 1)(m - 1)$
- $5(t - 3)(t + 4) - 5(t - 6)(t - 5)$
- $2(m + 3)^2 + 3(m - 1)^2 - 2(m - 4)$
- $4(2x + 1)(x + 5) - 3(3x - 2)(2x - 3)$
- $5(2m + 3)(4m + 1) + 2(5m + 6)(3m - 4)$
- $2(2x - 3)^2 - (3x + 5)(3x + 7) - 4x^2$

EXERCISE 2.3

- $x^2 + 5x + 6$
 - $x^2 + 3x + 2$
 - $x^2 + 2x - 15$
 - $m^2 + 5m - 36$
 - $x^2 + 13x + 42$
- $x^2 + 5x + 6$
 - $x^2 + 5x + 6$
 - $x^2 + x - 2$
 - $n^2 - 11n + 18$
 - $t^2 - 14t + 45$
- $x^2 + 6x + 8$
 - $y^2 - 9y + 20$
 - $x^2 + x - 56$
 - $m^2 - 17m + 66$
 - $14y^2 + 31y - 10$
 - $9x^2 + 30x + 25$
 - $25t^2 - 60t + 36$
 - $20m^2 + 3mn - 2n^2$
 - $49 - 64t^2$
- $2x^2 + 13x + 15$
 - $6m^2 - 17m + 5$
 - $4x^2 - 25$
 - $49t^2 + 56t + 16$
 - $9x^2 + 30xy + 25y^2$
- $6x^2 + 29x + 28$
 - $12m^2 - 24m + 9$
 - $8t^2 + 26t + 21$
 - $12x^2 - 17xy + 6y^2$
 - $-3x^2 + 5xy + 28y^2$
- $x^2 - 4x + 3$
 - $t^2 + 15t + 56$
 - $y^2 - 6y - 7$
 - $w^2 - 16$
 - $14y^2 + 31y - 10$
 - $9x^2 + 30x + 25$
 - $25t^2 - 60t + 36$
 - $20m^2 + 3mn - 2n^2$
 - $49 - 64t^2$
- $28x^2 - 55xy - 18y^2$
 - $12x^4 - 11x^3 + 2x^2$
 - $5x^5 - 21x^4 + 18$
 - $2x^2 + 20x + 33$
 - $60t - 210$
 - $70m^2 + 66m - 33$
 - $-3x^2 - 48x - 67$
- $72x^2 + 107xy + 30y^2$
 - $-x^4 + 5x^3y - 4x^2y^2$
 - $-8x^2 + 26xy - 21y^2$
 - $5x^2 + 27x + 46$
 - $5m^2 + 4m + 29$
 - $-5x^2 - 60x - 17$
 - $-84w^2 - 12w + 99$
- $56m^2 - 19mn - 15n^2$
 - $4t^4 - 28t^2 + 49$
 - $-m^2 - 15m + 22$
 - $-10x^2 + 83x + 2$
 - $-40t^2 + 49t + 16$