NAME _____ DATE _____ PERIOD ____

8-7 Study Guide and Intervention

Multiplying Polynomials

Multiply Binomials To multiply two binomials, you can apply the Distributive Property twice. A useful way to keep track of terms in the product is to use the FOIL method as illustrated in Example 2.

Example 1 **Find $(x + 3)(x - 4)$.**

Horizontal Method

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

$= x(x - 4) + 3(x - 4)$

$= (x)(x) + x(-4) + 3(x) + 3(-4)$

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

$= x^2 - x - 12$

Vertical Method

$$\begin{array}{rr} & x + 3 \\ (\times) & x - 4 \\ \hline & -4x - 12 \\ x^2 + 3x & \\ \hline x^2 - x - 12 & \end{array}$$

The product is $x^2 - x - 12$.

Example 2 **Find $(x - 2)(x + 5)$ using the FOIL method.**

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

First Outer Inner Last

$= (x)(x) + (x)(5) + (-2)(x) + (-2)(5)$

$= x^2 + 5x + (-2x) - 10$

$= x^2 + 3x - 10$

The product is $x^2 + 3x - 10$.

Lesson 8-7

Exercises

Find each product.

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

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

3. $(x - 6)(x - 2)$

4. $(p - 4)(p + 2)$

5. $(y + 5)(y + 2)$

6. $(2x - 1)(x + 5)$

7. $(3n - 4)(3n - 4)$

8. $(8m - 2)(8m + 2)$

9. $(k + 4)(5k - 1)$

10. $(3x + 1)(4x + 3)$

11. $(x - 8)(-3x + 1)$

12. $(5t + 4)(2t - 6)$

13. $(5m - 3n)(4m - 2n)$

14. $(a - 3b)(2a - 5b)$

15. $(8x - 5)(8x + 5)$

16. $(2n - 4)(2n + 5)$

17. $(4m - 3)(5m - 5)$

18. $(7g - 4)(7g + 4)$

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

Vertical Method

$$\begin{array}{r} x + 3 \\ (\times)\quad x - 4 \\ \hline -4x - 12 \\ x^2 + 3x \\ \hline x^2 - x - 12 \end{array}$$

The product is $x^2 - x - 12$.

Example 2 **Find $(x - 2)(x + 5)$ using the FOIL method.**

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

First Outer Inner Last

$= (x)(x) + (x)(5) + (-2)(x) + (-2)(5)$
$= x^2 + 5x + (-2x) - 10$
$= x^2 + 3x - 10$

The product is $x^2 + 3x - 10$.

Lesson 8-7

Exercises

Find each product.

1. $(x + 2)(x + 3)$ — $x^2 + 5x + 6$
2. $(x - 4)(x + 1)$ — $x^2 - 3x - 4$
3. $(x - 6)(x - 2)$ — $x^2 - 8x + 12$
4. $(p - 4)(p + 2)$ — $p^2 - 2p - 8$
5. $(y + 5)(y + 2)$ — $y^2 + 7y + 10$
6. $(2x - 1)(x + 5)$ — $2x^2 + 9x - 5$
7. $(3n - 4)(3n - 4)$ — $9n^2 - 24n + 16$
8. $(8m - 2)(8m + 2)$ — $64m^2 - 4$
9. $(k + 4)(5k - 1)$ — $5k^2 + 19k - 4$
10. $(3x + 1)(4x + 3)$ — $12x^2 + 13x + 3$
11. $(x - 8)(-3x + 1)$ — $-3x^2 + 25x - 8$
12. $(5t + 4)(2t - 6)$ — $10t^2 - 22t - 24$
13. $(5m - 3n)(4m - 2n)$ — $20m^2 - 22mn + 6n^2$
14. $(a - 3b)(2a - 5b)$ — $2a^2 - 11ab + 15b^2$
15. $(8x - 5)(8x + 5)$ — $64x^2 - 25$
16. $(2n - 4)(2n + 5)$ — $4n^2 + 2n - 20$
17. $(4m - 3)(5m - 5)$ — $20m^2 - 35m + 15$
18. $(7g - 4)(7g + 4)$ — $49g^2 - 16$