**8-3 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)

= $x^{2}$– 4*x* + 3*x* – 12

= $x^{2}$– *x* – 12

**Vertical Method**

*x* + 3

(×) *x* – 4

 – 4*x* – 12

 $x^{2}$ + 3*x*

$x^{2}$ – *x* – 12

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)

 = $x^{2}$ + 5*x* + (–2*x*) – 10

 = $x^{2}$ + 3*x* – 10

The product is $x^{2}$ + 3*x* – 10.

**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.** (2*x* – 1)(*x* + 5)

 **7.** (3*n* – 4)(3*n* – 4) **8.** (8*m* – 2)(8*m* + 2) **9.** (*k* + 4)(5*k* – 1)

**10.** (3*x* + 1)(4*x* + 3) **11.** (*x* – 8)(–3*x* + 1) **12.** (5*t* + 4)(2*t* – 6)

**13.** (5*m* – 3*n*)(4*m* – 2*n*) **14.** (*a* – 3*b*)(2*a* – 5*b*) **15.** (8*x* – 5)(8*x* + 5)

**16.** (2*n* – 4)(2*n* + 5) **17.** (4*m* – 3)(5*m* – 5) **18.** (7*g* – 4)(7*g* + 4)

**8-3 Study Guide and Intervention** *(continued)*

***Multiplying Polynomials***

**Multiply Polynomials** The Distributive Property can be used to multiply any two polynomials.

**Example:**

**Find (3*x* + 2)(2**$x^{2}$**– 4*x* + 5).**

(3*x* + 2)(2$x^{2}$ – 4*x* + 5)

 = 3*x*(2$x^{2}$ – 4*x* + 5) + 2(2$x^{2}$ – 4*x* + 5) Distributive Property

 = 6$x^{3}$ – 12$x^{2}$ + 15*x* + 4$x^{2}$– 8*x* + 10 Distributive Property

 = 6$x^{3}$ – 8$x^{2}$ + 7*x* + 10 Combine like terms.

The product is 6$x^{3}$ – 8$x^{2}$ + 7*x* + 10.

**Exercises**

**Find each product.**

 **1.** (*x* + 2)($ x^{2}$ – 2*x* + 1) **2.** (*x* + 3)(2$x^{2}$ + *x* – 3)

 **3.** (2*x* – 1)($ x^{2}$ – *x* + 2) **4.** (*p* – 3)($ p^{2}$ – 4*p* + 2)

 **5.** (3*k* + 2)($ k^{2}$ + *k* – 4) **6.** (2*t* + 1)(10$t^{2}$ – 2*t* – 4)

 **7.** (3*n* – 4)($ n^{2}$ + 5*n* – 4) **8.** (8*x* – 2)(3$x^{2}$ + 2*x* – 1)

 **9.** (2*a* + 4)(2$a^{2}$ – 8*a* + 3) **10.** (3*x* – 4)(2$x^{2}$ + 3*x* + 3)

**11.** ($n^{2}$ + 2*n* – 1)($ n^{2}$ + *n* + 2) **12.** ($t^{2}$ + 4*t* – 1)(2$t^{2}$ – *t* – 3)

**13.** ($y^{2}$ – 5*y* + 3)(2$y^{2}$ + 7*y* – 4) **14.** (3$b^{2}$ – 2*b* + 1)(2$b^{2}$ – 3*b* – 4)