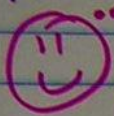


## 7B Multiplying Binomials Mentally

Review: ①  $(x+5)(x+4)$



...In your head

$$\rightarrow x^2 + 4x + 5x + 20$$

$$x^2 + 9x + 20$$

First  
Outside  
Inside  
Last

②  $(x-2)(x-6)$

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

③  $(x-8)(x+2)$

$$x^2 - 6x - 16$$

④  $(x+10)(x+6)$

$$x^2 + 16x + 60$$

⑤  $(x-3)(x-5)$

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

⑥  $(x-10)(x+4)$

$$x^2 - 6x - 40$$

⑦  $(3x+2)(x+4)$

$$3x^2 + 14x + 8$$

⑧  $(2x-5)(x+3)$

$$2x^2 + x - 15$$

$$\textcircled{9} \quad (5 - 2x)(3 + 4x)$$

$$\boxed{15 + 14x - 8x^2}$$

$$\textcircled{10} \quad (4a + b)(2a - 3b)$$

$$\boxed{8a^2 - 10ab - 3b^2}$$



- Set D

- WS 7A #17-33 odds

- WS 7B, (# 2-28) evens

## 7B Multiplying Binomials Mentally

**Objective:** To find the product of two binomials mentally.

### Vocabulary

**Quadratic Term** A term of degree two. For example,  $2x^2$ .

**Linear Term** A term of degree one. For example,  $5x$ .

**Quadratic Polynomial** A polynomial whose term of greatest degree is quadratic. For example,  $2x^2 - 5x + 7$ .

**Example 1** Write  $(3x + 1)(4x - 5)$  as a trinomial.

**Solution 1** You can work horizontally as shown at the left or vertically as shown at the right.

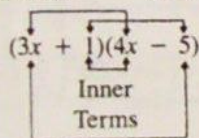
$$\begin{aligned} (3x + 1)(4x - 5) &= 3x(4x - 5) + 1(4x - 5) \\ &= 12x^2 - 15x + 4x - 5 \\ &= 12x^2 - 11x - 5 \end{aligned}$$

$$\begin{array}{r} 4x - 5 \\ 3x + 1 \\ \hline 12x^2 - 15x \\ \phantom{12x^2} + 4x - 5 \\ \hline 12x^2 - 11x - 5 \end{array}$$

**Solution 2** Use the FOIL method to multiply in your head.

Think of the products of these terms:

First Terms                      Last Terms



Outer Terms

Then write the products:

$$12x^2 - 15x + 4x - 5 = 12x^2 - 11x - 5$$

First	Outer	Inner	Last
terms	terms	terms	terms

Write each product as a trinomial.

- |  |   |
|--|---|
| <p>1. <math>(x + 6)(x + 1)</math></p> <p>3. <math>(a - 4)(a - 2)</math></p> <p>5. <math>(c + 2)(c + 6)</math></p> <p>7. <math>(a - 3)(a - 7)</math></p> <p>9. <math>(k - 4)(k - 7)</math></p> <p>11. <math>(c - 6)(c + 7)</math></p> <p>13. <math>(2a + 3)(a + 4)</math></p> | <p>2. <math>(y + 3)(y + 4)</math></p> <p>4. <math>(x - 5)(x - 6)</math></p> <p>6. <math>(k - 3)(k - 6)</math></p> <p>8. <math>(2 + x)(3 + x)</math></p> <p>10. <math>(b - 2)(b + 7)</math></p> <p>12. <math>(a - 4)(a - 6)</math></p> <p>14. <math>(3x + 2)(x + 4)</math></p> |
|--|---|

## 7B Multiplying Binomials Mentally (continued)

DATE \_\_\_\_\_

Write each product as a trinomial.

15.  $(2a + 7)(a - 2)$

17.  $(3a - 5)(2a - 1)$

19.  $(2k + 1)(3k + 4)$

21.  $(4x + 3)(2x - 1)$

16.  $(4a - 1)(3a - 1)$

18.  $(3 - 2a)(2 - 3a)$

20.  $(3x - 2)(x + 5)$

22.  $(7m - 3)(6m + 2)$

**Example 2** Write  $(3x - 4y)(5x + y)$  as a trinomial.

**Solution**

$$\begin{array}{l} \begin{array}{c} \text{F} \quad \text{O} \quad \text{I} \quad \text{L} \\ (3x - 4y)(5x + y) = 15x^2 + (3xy - 20xy) - 4y^2 \\ \phantom{(3x - 4y)(5x + y)} = 15x^2 - 17xy - 4y^2 \end{array} \end{array}$$

Write each product as a trinomial.

23.  $(a - 2b)(a + b)$

24.  $(x + 3y)(x + 2y)$

25.  $(2x + y)(3x - 2y)$

26.  $(3x + y)(x + 2y)$

27.  $(4x + y)(2x - 3y)$

28.  $(6a - b)(5a - 2b)$

**Example 3** Write  $(m^2 - 3m)(2m^2 + 5m)$  as a trinomial.

**Solution**

$$\begin{array}{l} \begin{array}{c} \text{F} \quad \text{O} \quad \text{I} \quad \text{L} \\ (m^2 - 3m)(2m^2 + 5m) = m^2(2m^2) + m^2(5m) + (-3m)(2m^2) + (-3m)(5m) \\ \phantom{(m^2 - 3m)(2m^2 + 5m)} = 2m^4 + (5m^3 - 6m^3) - 15m^2 \\ \phantom{(m^2 - 3m)(2m^2 + 5m)} = 2m^4 - m^3 - 15m^2 \end{array} \end{array}$$

Write each product as a trinomial.

29.  $(x^2 - 2x)(2x^2 + 3x)$

30.  $(a^2 - 3b)(2a^2 + b)$

31.  $(u^2 + v^2)(u^2 - 4v^2)$

32.  $(a^3 - 3b^3)(a^3 + 4b^3)$

33.  $(x^3 - 2x)(x^3 + 1)$

34.  $(x^3 - y^2)(3x^3 + y^2)$

### Mixed Review Exercises

Simplify.

1.  $(3x^2y)(-5x^2y^3)$

2.  $(6x^2y^4)^3$

3.  $(2n + 3)(3n^2 + n - 2)$

4.  $\frac{15r^2 + 20r - 25}{5}$

5.  $\frac{(4y)^3}{4y}$

6.  $\frac{12 - 6x - 2x^2}{2}$

Solve.

7.  $n = 32 - 3n$

8.  $3x - (2x + 7) = 7$

9.  $4(n + 1) = 3(4 + n)$

10.  $5y + 3 = 53$

11.  $2(x - 1) - 5 = 9$

12.  $5(y - 2) + 4 = 14$