

# 9-3 Study Guide and Intervention

## Factoring Trinomials: $x^2 + bx + c$

Answer Key

**Factor  $x^2 + bx + c$**  To factor a trinomial of the form  $x^2 + bx + c$ , find two integers,  $m$  and  $n$ , whose sum is equal to  $b$  and whose product is equal to  $c$ .

Factoring $x^2 + bx + c$	$x^2 + bx + c = (x + m)(x + n)$ , where $m + n = b$ and $mn = c$ .
--------------------------	--

**Example 1** Factor each trinomial.

a.  $x^2 + 7x + 10$

In this trinomial,  $b = 7$  and  $c = 10$ .

Factors of 10	Sum of Factors
1, 10	11
2, 5	7

Since  $2 + 5 = 7$  and  $2 \cdot 5 = 10$ , let  $m = 2$  and  $n = 5$ .

$$x^2 + 7x + 10 = (x + 5)(x + 2)$$

b.  $x^2 - 8x + 7$

In this trinomial,  $b = -8$  and  $c = 7$ .

Notice that  $m + n$  is negative and  $mn$  is positive, so  $m$  and  $n$  are both negative.

Since  $-7 + (-1) = -8$  and  $(-7)(-1) = 7$ ,  $m = -7$  and  $n = -1$ .

$$x^2 - 8x + 7 = (x - 7)(x - 1)$$

**Example 2** Factor  $x^2 + 6x - 16$ .

In this trinomial,  $b = 6$  and  $c = -16$ . This means  $m + n$  is positive and  $mn$  is negative. Make a list of the factors of  $-16$ , where one factor of each pair is positive.

Factors of -16	Sum of Factors
1, -16	-15
-1, 16	15
2, -8	-6
-2, 8	6

Therefore,  $m = -2$  and  $n = 8$ .

$$x^2 + 6x - 16 = (x - 2)(x + 8)$$

**Exercises**

Factor each trinomial.

1.  $x^2 + 4x + 3$   
 $(x + 3)(x + 1)$

4.  $x^2 - x - 6$   
 $(x - 3)(x + 2)$

7.  $c^2 - 4c - 12$   
 $(c + 2)(c - 6)$

10.  $x^2 + 6x + 5$   
 $(x + 5)(x + 1)$

2.  $m^2 + 12m + 32$   
 $(m + 4)(m + 8)$

5.  $x^2 - 4x - 21$   
 $(x - 7)(x + 3)$

8.  $p^2 - 16p + 64$   
 $(p - 8)(p - 8)$

3.  $r^2 - 3r + 2$   
 $(r - 2)(r - 1)$

6.  $x^2 - 22x + 121$   
 $(x - 11)(x - 11)$

9.  $9 - 10x + x^2$   
 $(9 - x)(1 - x)$

Packet #3 Answer

Key