

9.5 Factor $x^2 + bx + c$

TEKS

A.1.C, A.4.A,
A.10.A

Before

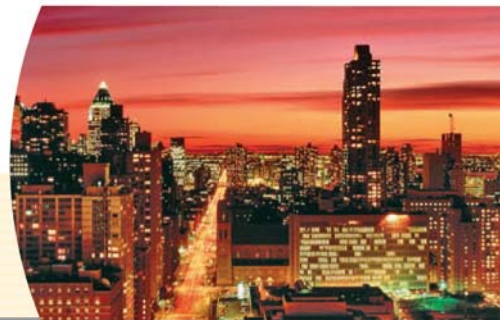
You factored out the greatest common monomial factor.

Now

You will factor trinomials of the form $x^2 + bx + c$.

Why

So you can find the dimensions of figures, as in Ex. 61.



Key Vocabulary

• **zero of a function**,
p. 337

From Lesson 9.2, you know that

$$(x + 3)(x + 4) = x^2 + (4 + 3)x + 4 \cdot 3 = x^2 + 7x + 12.$$

You will reverse this process to factor trinomials of the form $x^2 + bx + c$.

KEY CONCEPT

For Your Notebook

Factoring $x^2 + bx + c$

Algebra $x^2 + bx + c = (x + p)(x + q)$ provided $p + q = b$ and $pq = c$.

Example $x^2 + 5x + 6 = (x + 3)(x + 2)$ because $3 + 2 = 5$ and $3 \cdot 2 = 6$.

EXAMPLE 1 Factor when b and c are positive

Factor $x^2 + 11x + 18$.

Solution

Find two positive factors of 18 whose sum is 11. Make an organized list.

Factors of 18	Sum of factors	
18, 1	$18 + 1 = 19$	✗
9, 2	$9 + 2 = \mathbf{11}$	← Correct sum
6, 3	$6 + 3 = 9$	✗

The factors 9 and 2 have a sum of 11, so they are the correct values of p and q .

► $x^2 + 11x + 18 = (x + 9)(x + 2)$

CHECK $(x + 9)(x + 2) = x^2 + 2x + 9x + 18$ **Multiply binomials.**
 $= x^2 + 11x + 18$ ✓ **Simplify.**



GUIDED PRACTICE for Example 1

Factor the trinomial.

1. $x^2 + 3x + 2$

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

3. $t^2 + 9t + 14$