

**8-4** Factoring  $ax^2 + bx + c$ Warm UpLesson PresentationLesson Quiz**8-4** Factoring  $ax^2 + bx + c$ **Warm Up****Find each product.**

1.  $(x - 2)(2x + 7)$   $2x^2 + 3x - 14$

2.  $(3y + 4)(2y + 9)$   $6y^2 + 35y + 36$

3.  $(3n - 5)(n - 7)$   $3n^2 - 26n + 35$

**Find each trinomial.**

4.  $x^2 + 4x - 32$   $(x - 4)(x + 8)$

5.  $z^2 + 15z + 36$   $(z + 3)(z + 12)$

6.  $h^2 - 17h + 72$   $(h - 8)(h - 9)$

**8-4** Factoring  $ax^2 + bx + c$

**Objective**

Factor quadratic trinomials of the form  $ax^2 + bx + c$ .

**8-4** Factoring  $ax^2 + bx + c$

**The Box Method for Factoring a Polynomial**

Factor Completely

EXAMPLE:  $10x^2 + 11x - 6$

1<sup>st</sup> create a 2x2 box


2<sup>nd</sup>, in the top left corner put the first term and in the bottom right corner put the last term.

$10x^2$	
	$-6$

## 8-4 Factoring $ax^2 + bx + c$

3<sup>rd</sup>, multiply these two terms together to get  $-60x^2$ . Find two factors of  $-60x^2$  that when added together they will give you the middle term  $11x$ . These are  $15x$  and  $-4x$ . Put these into the open boxes.

$-60x^2$

-1	60	-610
-2	30	
-3	20	
-4	15	
-5	12	

$10x^2$	$15x$
$-4x$	$-6$

Determine the sign

4<sup>th</sup>, factor the terms in each row and in each column.

	$2x$	$3$
$5x$	$10x^2$	$15x$
$-2$	$-4x$	$-6$

5<sup>th</sup>, the sum of the factors for the columns and the sum of the factors for the rows are the polynomial's factors:  $(2x+3)(5x-2)$

## 8-4 Factoring $ax^2 + bx + c$

### Check It Out! Example 1a

Factor each trinomial by guess and check.

$6x^2 + 11x + 3$

Handwritten work for factoring  $6x^2 + 11x + 3$ :

$18x^2$   
 $1x \quad 18x = 19x$   
 $2x \quad 9x = 11x$

$(3x+1)(2x+3)$   
 $6x^2 + 9x + 2x + 3$   
 $6x^2 + 11x + 3$

$2x \quad 3$   

$6x^2$	$9x$
$2x$	$3$

### 8-4 Factoring $ax^2 + bx + c$

#### Check It Out! Example 1b

Factor each trinomial by guess and check.

$$3x^2 - 2x - 8$$

Handwritten work for factoring  $3x^2 - 2x - 8$  using the guess and check method.

Initial guess:  $(3x^2 - 24x^2)$

Testing pairs:

- $1x \quad -24x = -23x$
- $2x \quad -12x = -10x$
- $3x \quad -8x = -5x$
- $4x \quad -6x = -2x$  (Correct pair)

Final factors:  $(3x+4)(x-2)$

AC method grid:

$3x$	$4$
$3x^2$	$4x$
$-6x$	$-8$

### 8-4 Factoring $ax^2 + bx + c$

#### Example 2A: Factoring $ax^2 + bx + c$ When $c$ is Positive

Factor each trinomial. Check your answer.

$$2x^2 + 17x + 21$$

Handwritten work for factoring  $2x^2 + 17x + 21$  using the guess and check method.

Initial guess:  $(42x^2)$

Testing pairs:

- $1x \quad 42x$
- $2x \quad 21x$
- $3x \quad 14x$  (Correct pair)

Final factors:  $(2x+3)(x+7)$

AC method grid:

$2x$	$3$
$2x^2$	$3x$
$14x$	$21$

**8-4** Factoring  $ax^2 + bx + c$ **Example 2B: Factoring  $ax^2 + bx + c$  When  $c$  is Positive**

Factor each trinomial. Check your answer.

$$3x^2 - 16x + 16$$


**8-4** Factoring  $ax^2 + bx + c$ **Example 3B: Factoring  $ax^2 + bx + c$  When  $c$  is Negative**

Factor each trinomial. Check your answer.

$$2x^2 + 9x - 18$$




## 8-4 Factoring $ax^2 + bx + c$

### Check It Out! Example 4a

Factor each trinomial. Check your answer.

$-6x^2 - 17x - 12$

$-1(6x^2 + 17x + 12)$

$72x^2$   
 $1x \quad 72x$

$2x$	$3$
$3x$	$6x^2$
	$9x$
$4$	$8x$
	$12$

$(-2x-3)(3x+4)$   
 $(2x+3)(-3x-4)$   $9x$

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

## 8-4 Factoring $ax^2 + bx + c$

### Lesson Quiz

Factor each trinomial. Check your answer.

- $5x^2 + 17x + 6$   $(5x+2)(x+3)$
- $2x^2 + 5x - 12$   $(2x \quad )(x \quad )$
- $6x^2 - 23x + 7$   $( \quad - \quad )( \quad - \quad )$
- $-4x^2 + 11x + 20$
- $-2x^2 + 7x - 3$   $-1(2x-1)(x-3)$
- $8x^2 + 27x + 9$

p. 572  
# 42-64 even, 68

Feb 25-10:00 AM