


Section 6.2


Factoring Trinomials Whose Leading Coefficient is 1



Dive In!

Did you know that when you jump upward from a diving board, your height at any given time can be calculated using a trinomial expression?

An application exercise in this section of the textbook will explore this situation in detail.



First Steps:

- Take comprehensive notes** from your instructor's lecture and insert your notes into this section of the *Learning Guide*. Be sure to write down all examples, definitions, and other key concepts. Additional learning resources include the *Lecture Series on DVD*, the *PowerPoints*, and Section 6.2 of your textbook which begins on page 427.
- Complete the *Concept and Vocabulary Check* on page 433 of the textbook.

Guided Practice:

- Review each of the following *Solved Problems* and complete each *Pencil Problem*.

Objective #1: Factor trinomials of the form $x^2 + bx + c$.

✓ *Solved Problem #1*

1a. Factor: $x^2 + 5x + 6$

Factors of 6	6,1	-6,-1	2,3	-2,-3
Sum of Factors	7	-7	5	-5

The factors of 6 whose sum is 5, are 2 and 3.

Thus, $x^2 + 5x + 6 = (x + 2)(x + 3)$.

Check:

$$\begin{aligned} (x + 2)(x + 3) &= x^2 + 3x + 2x + 6 \\ &= x^2 + 5x + 6 \end{aligned}$$

✎ *Pencil Problem #1*

1a. Factor: $x^2 + 7x + 10$

1b. Factor: $x^2 - 6x + 8$

Factors of 8	8,1	-8,-1	2,4	-2,-4
Sum of Factors	9	-9	6	-6

The factors of 8 whose sum is -6 , are -2 and -4 .

$$\text{Thus, } x^2 - 6x + 8 = (x - 2)(x - 4).$$

Check:

$$\begin{aligned} (x - 2)(x - 4) &= x^2 - 4x - 2x + 8 \\ &= x^2 - 6x + 8 \end{aligned}$$

1b. Factor: $x^2 - 7x + 12$ **1c.** Factor: $x^2 + 3x - 10$

Factors of -10	$-10, 1$	$10, -1$	$-5, 2$	$5, -2$
Sum of Factors	-9	9	-3	3

The factors of -10 whose sum is 3 , are 5 and -2 .

$$\text{Thus, } x^2 + 3x - 10 = (x + 5)(x - 2).$$

Check:

$$\begin{aligned} (x + 5)(x - 2) &= x^2 - 2x + 5x - 10 \\ &= x^2 + 3x - 10 \end{aligned}$$

1c. Factor: $y^2 + 10y - 39$ **1d.** Factor: $y^2 - 6y - 27$

The factors of -27 whose sum is -6 , are -9 and 3 .

$$\text{Thus, } y^2 - 6y - 27 = (y - 9)(y + 3).$$

1d. Factor: $x^2 - 2x - 15$

1e. Factor: $x^2 + x - 7$

No factor pair of -7 has a sum of 1 .

Thus, $x^2 + x - 7$ is prime.

1e. Factor: $x^2 + 4x + 12$

1f. Factor: $x^2 - 4xy + 3y^2$

The factors of 3 whose sum is -4 , are -3 and -1 .

Thus, $x^2 - 4xy + 3y^2 = (x - 3y)(x - y)$.

1f. Factor: $x^2 + 7xy + 6y^2$

1g. Factor: $2x^3 + 6x^2 - 56x$

First factor out the common factor of $2x$.

$$2x^3 + 6x^2 - 56x = 2x(x^2 + 3x - 28)$$

Continue by factoring the trinomial.

$$\begin{aligned} 2x^3 + 6x^2 - 56x &= 2x(x^2 + 3x - 28) \\ &= 2x(x - 4)(x + 7) \end{aligned}$$

1g. Factor: $3x^2 + 15x + 18$

1h. Factor: $-2y^2 - 10y + 28$

First factor out the common factor of -2 .

$$-2y^2 - 10y + 28 = -2(y^2 + 5y - 14)$$

Continue by factoring the trinomial.

$$\begin{aligned} -2y^2 - 10y + 28 &= -2(y^2 + 5y - 14) \\ &= -2(y - 2)(y + 7) \end{aligned}$$

1h. Factor: $-2x^3 - 6x^2 + 8x$

Answers for Pencil Problems (*Textbook Exercise references in parentheses*):

1a. $(x + 5)(x + 2)$ (6.2 #3)

1b. $(x - 4)(x - 3)$ (6.2 #7)

1c. $(y + 13)(y - 3)$ (6.2 #15)

1d. $(x - 5)(x + 3)$ (6.2 #17)

1e. prime (6.2 #21)

1f. $(x + 6y)(x + y)$ (6.2 #35)

1g. $3(x + 2)(x + 3)$ (6.2 #43)

1h. $-2x(x + 4)(x - 1)$ (6.2 #73)

Homework:

- Review the Section 6.2 summary** on page 476 of the textbook.
- Insert your homework** into this section of the *Learning Guide*. Show all work neatly and check your answers. Strive to work through difficulties when possible, making note of any exercises where you need additional help. Remember, even if your instructor assigns homework through *MyMathLab*, you should still write out your work.