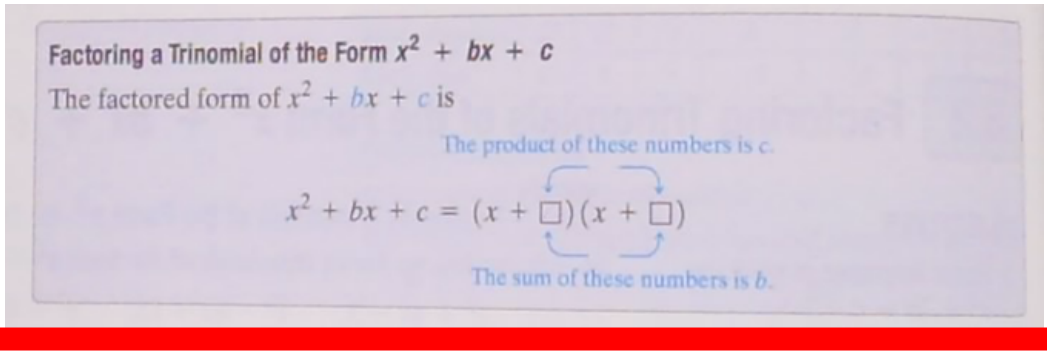
6.2 Factoring Trinomials of the Form $x^2 + bx + c$

OBJECTIVE 1: Factoring Trinomials of the Form $x^2 + bx + c$

These all have the coefficient of the squared variable is 1, a = 1. Factoring is the reverse of FOIL. To check your factored answer, FOIL your answer.



Factoring a Trinomial of the Form $x^2 + bx + c$

The factored form of $x^2 + bx + c$ is

The product of these numbers is c.

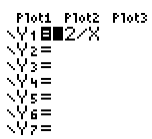
$$x^2 + bx + c = (x + \square)(x + \square)$$

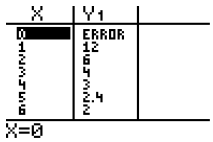
The sum of these numbers is b.

Example 1: Factor $x^2 + 7x + 12$

$(x+3)(x+4)$

12
1 12
2 6
3 4





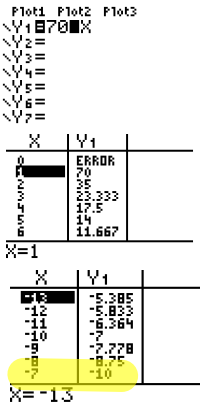
Practice 1: $x^2 + 5x + 6$

$(x+2)(x+3)$

6
1 6
2 3

Example 2: Factor $x^2 - 17x + 70$

$(x - 7)(x - 10)$



Practice 2: $x^2 - 12x + 35$

$(x-7)(x-5)$

Example 3: Factor $x^2 + 4x - 12$

$(x-2)(x+6)$

$(x+6)(x-2)$

-12

$1 \quad -12$

$-1 \quad 12$

$2 \quad -6$

$-2 \quad 6$

$3 \quad -4$

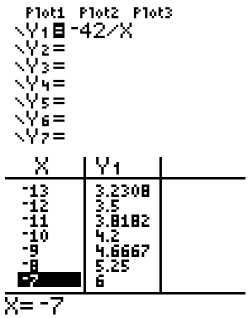
$-3 \quad 4$

Practice 3: $x^2 + 5x - 14$

$(x+7)(x-2)$

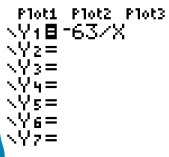
Example 4: Factor $r^2 - r - 42$

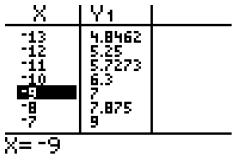
$(r-7)(r+6)$



Practice 4: $p^2 - 2p - 63$

$(p-9)(p+7)$





Example 5: Factor $a^2 + 2a + 10$

non-factorable

10

1 10

2 5

Practice 5: $b^2 + 5b + 1$

non-factorable

Example 6: Factor $x^2 + 7xy + 6y^2$

$(x + \quad y)(x + 6y)$

6
1 6
2 3

Practice 6: $x^2 + 7xy + 12y^2$

$(x + 3y)(x + 4y)$

12
1 12
2 6
3 4

Example 7: Factor $x^4 + 5x^2 + 6$

$(x^2 + 2)(x^2 + 3)$

6
1 6
2 3

Practice 7: $x^4 + 13x^2 + 12$

$(x^2 + 1)(x^2 + 12)$

12
1 12
2 6
3 4

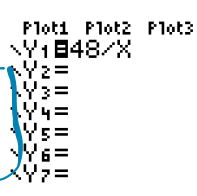
Example 8: Factor $40 - 13m + m^2$

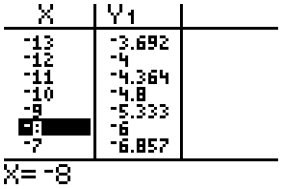
$(-5+m)(-8+m)$

40
-1 -40
-2 -20
-4 -10
-5 -8

Practice 8: $48 - 14x + x^2$

$(-8+x)(-6+x)$





Helpful Hint

A positive constant in a trinomial tells us to look for two numbers with the same sign. The sign of the coefficient of the middle term tells us whether the signs are both positive or both negative.

both positive same sign

$x^2 + 10x + 16 = (x + 2)(x + 8)$

both negative same sign

$x^2 - 10x + 16 = (x - 2)(x - 8)$

A negative constant in a trinomial tells us to look for two numbers with opposite signs.

opposite signs

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

opposite signs

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

OBJECTIVE 2: Factoring Out the Greatest Common Factor (GCF)

Example 9: Factor $3m^2 - 24m - 60$

$3(m^2 - 8m - 20)$

$3(m+2)(m-10)$

-20

$1 \cdot -20$

$2 \cdot -10$

$4 \cdot -5$

Practice 9: $4x^2 - 24x + 36$

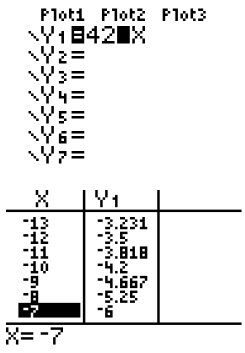
$4(x^2 - 6x + 9)$

$4(x-3)(x-3)$

Example 10: Factor $2x^4 - 26x^3 + 84x^2$

$2x^2(x^2 - 13x + 42)$

$2x^2(x-7)(x-6)$



Practice 10: $3y^4 - 18y^3 - 21y^2$

$3y^2(y^2 - 6y - 7)$

$3y^2(y-7)(y+1)$

Vocabulary, Readiness & Video Check

Fill in each blank with "true" or "false."

1. To factor $x^2 + 7x + 6$, we look for two numbers whose product is 6 and whose sum is 7. true
2. We can write the factorization $(y + 2)(y + 4)$ also as $(y + 4)(y + 2)$. true
3. The factorization $(4x - 12)(x - 5)$ is completely factored. false
4. The factorization $(x + 2y)(x + y)$ may also be written as $(x + 2y)^2$. false

Complete each factored form.

5. $x^2 + 9x + 20 = (x + 4)(x + 5)$
6. $x^2 + 12x + 35 = (x + 5)(x + 7)$
7. $x^2 - 7x + 12 = (x - 4)(x - 3)$
8. $x^2 - 13x + 22 = (x - 2)(x - 11)$
9. $x^2 + 4x + 4 = (x + 2)(x + 2)$
10. $x^2 + 10x + 24 = (x + 6)(x + 4)$

6.2 HW: pg. 392

1 - 75 (eoo)