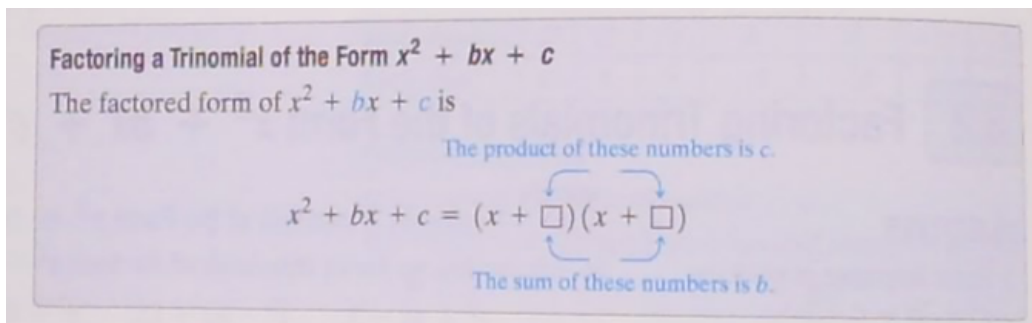


6.2 Factoring Trinomials of the Form $x^2 + bx + c$

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.



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

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

$$\begin{array}{r} 12 \\ 1 \ 12 \\ 2 \ 6 \\ \hline 3 \ 4 \end{array}$$

Plot1	Plot2	Plot3
Y1	$2 \cdot X$	
Y2		
Y3		
Y4		
Y5		
Y6		
Y7		

X	Y1
0	ERROR
1	4
2	4
3	15
4	28
5	45
6	66
7	91
8	120
9	153
10	190
11	231
12	276
13	325
14	378
15	435
16	496
17	561
18	630
19	703
20	780
21	861
22	946
23	1035
24	1128
25	1225
26	1326
27	1431
28	1540
29	1653
30	1770
31	1891
32	2016
33	2145
34	2278
35	2415
36	2556
37	2701
38	2850
39	2993
40	3140
41	3291
42	3446
43	3605
44	3768
45	3935
46	4106
47	4281
48	4460
49	4643
50	4830
51	5021
52	5216
53	5415
54	5618
55	5825
56	6036
57	6251
58	6470
59	6693
60	6920
61	7151
62	7386
63	7625
64	7868
65	8115
66	8366
67	8621
68	8880
69	9143
70	9410
71	9681
72	9956
73	10235
74	10518
75	10805
76	11096
77	11391
78	11690
79	11993
80	12300
81	12611
82	12926
83	13245
84	13568
85	13895
86	14226
87	14561
88	14900
89	15243
90	15590
91	15941
92	16296
93	16655
94	17018
95	17385
96	17756
97	18131
98	18510
99	18893
100	19280

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

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

$$\begin{array}{r} 6 \\ 1 \ 6 \\ \hline 2 \ 3 \end{array}$$

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

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

X	Y1
0	ERROR
7	70
10	333
17	8
14	11.667

X	Y1
-13	-5.385
-12	-6.853
-11	-8.664
-10	-10.778
-9	-13.25
-8	-16

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

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

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

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

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

$$\begin{array}{r} -12 \\ \hline -1 \quad -12 \\ -1 \quad 12 \\ \hline 2 \quad -6 \\ \hline -2 \quad 6 \\ \hline -3 \quad -4 \\ -3 \quad 4 \end{array}$$

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

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

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

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

X	Y1
-13	3.2308
-12	3.5
-11	3.8182
-10	4.2
-9	4.6667
-8	5.25
-7	6

X = -7

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

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

X	Y1
-13	4.8462
-12	5.25
-11	5.7273
-10	6.3
-9	7
-8	7.875
-7	9

X = -9

X	Y1
-13	4.8462
-12	5.25
-11	5.7273
-10	6.3
-9	7
-8	7.875
-7	9

X = -9

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

non-factorable

$$\frac{10}{2 \cdot 5}$$

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

non-factorable

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

$$(x + y)(x + 6y)$$

$$\begin{array}{r} 6 \\ \hline 1 \ 6 \\ \hline 2 \ 3 \end{array}$$

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

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

$$\begin{array}{r} 12 \\ \hline 1 \ 12 \\ 2 \ 6 \\ \hline 3 \ 4 \end{array}$$

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

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

$$\begin{array}{r} 6 \\ \hline 1 \ 6 \\ \hline 2 \ 3 \end{array}$$

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

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

$$\begin{array}{r} 12 \\ \hline 1 \ 12 \\ 2 \ 6 \\ 3 \ 4 \end{array}$$

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

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

$$\begin{array}{r} 40 \\ -1 - 40 \\ -2 - 20 \\ -4 - 10 \\ \hline -5 - 8 \end{array}$$

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

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

P1001 P1002 P1003
 Y1 48/X
 Y2 =
 Y3 =
 Y4 =
 Y5 =
 Y6 =
 Y7 =

X	Y1
-13	-2.692
-12	-4
-11	-4.264
-10	-4.8
-9	-5.333
-8	-6
-7	-6.857

X = -8

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 ↓	both negative ↓	same sign ↓
$x^2 + 10x + 16 = (x + 2)(x + 8)$		$x^2 - 10x + 16 = (x - 2)(x - 8)$	

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

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

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

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

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

$$\boxed{3(m+2)(m-10)}$$

$$\begin{array}{r} -20 \\ \underline{1-20} \\ (2-10) \\ \underline{4-5} \end{array}$$

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

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

$$\boxed{4(x-3)(x-3)}$$

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

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

$$\boxed{2x^2(x-7)(x-6)}$$


X	Y1
-13	-3.231
-12	-3.5
-11	-3.818
-10	-4.2
-9	-4.667
-8	-5.25
-7	-6

X = -7

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

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

$$\boxed{3y^2(y-7)(y+1)}$$

 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)