Factoring x^2+bx+c

In this lesson you will learn how to factor a trinomial into two binomials.

Take a look at the following example.

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

Notice that 12 is the product of 3 and 4 and 7 is the sum of 3 and 4.

To factor a quadratic trinomial of the form x^2+bx+c, find two factors of c whose sum is b.

Notes: Factoring x^2+bx+c

1) If c is positive, both factors have the same signs (both are positive or negative).Take both signs positive if b is positive and take both signs negative if b is negative.

2) If c is negative, the factors have the different signs (one is positive and the other is negative).The sign of the bigger factor takes the sign of the sum.

Example 1: Factor each of the following trinomials if possible.

1) $x^2+8x+12$

Factor of 12	Sum
1,12	13
2,6	8
3,4	7

$x^2+8x+12=(x+2)(x+6)$

2) x^2-x-12

Factor of 12	Sum
-1,12	11
1,-12	-11
-2,6	4
2,-6	-4
-3,4	1
3,-4	-1

$x^2-x-12=(x-4)(x+3)$

3) $x^2-7x+12$

Factor of 12	Sum
-1,-12	-13
-2,-6	-8
-3,-4	-7

$x^2-7x+12=(x-4)(x-3)$

4) $x^2+10x+12$

Factor of 12	Sum
1,12	13
2,6	8
3,4	7

$x^2+10x+12$ is prime(not factorable using integers).

Example 2: Find all the values of *k* so that the trinomial $x^2+kx+18$ can be factored using integers.

Factor of 18	Sum
1,18	19
-1,-18	-19
2,9	11
-2,-9	-11
3,6	9
-3,-6	-9

$k=19,-19,11,-11,9,-9$

Find all values of k so that each trinomial can be factored using integers.