Factoring ax^2+bx+c

When you multiply $(2x+5)(3x+2)$, the coefficent of the x^2- term (a) is the product of the coefficents of the x- terms.The constant (c) term in the trinomial is the product of the constants in the binomials.The coefficent of the x- term (b) is the sum of the products of the inner and outer terms.

$(2x)(3x)=6x^2=a$

$(5)(2)=10=c$

$(2)(2x)+(5)(3x)=4x+15x=19x=b$

To factor ax^2+bx+c using the trial method, check the factors of a and the factors of c. The sum of the products of the inner and the outer terms should be b.

Example 1: Factor $4x^2+16x+15$

$4x^2+16x+15=(\square+\square)(\square+\square)$

Factors of 4	Factors of 15	Outer + Inner
1,4	1,15	1(1) + 4(15)= 61
1,4	15,1	1(15) + 4(1)= 19
1,4	3,5	1(3) + 4(5)= 23
1,4	5,3	1(5) + 4(3)= 17
2,2	1,15	2(1) + 2(15)= 32
2,2	3,5	2(3) + 2(5)= 16

$4x^2+16x+15=(2x+3)(2x+5)$

Another method can be used to factor such trinomials.
To factor $4x^2+16x+15$, first find the product of 4 and 15.
The product of 4 and 15 is 60. So, you need to find two numbers whose product is 60 and their sum is 16.

Factors of 60	Sum
1,60	61
2,30	32
3,20	23
4,15	19
5,12	17
6,10	16

$4x^2+16x+15$

$=4x^2+(6+10)x+15$ Select 6 and 10

$=4x^2+6x+10x+15$

$=(4x^2+6x)+(10x+15)$ Group terms.

$=2x(2x+3)+5(2x+3)$ Factor out the GCF for each group.

$=(2x+5)(2x+3)$ Factor out the GCF.