At first perform operation on the left side of the equation  $-4(x-2)(x+3)-5x^2-4$  **Find type of expression on the left side** left side has the form of the multiplication of the polynomials by factor  $a(bx+c)(dx+e)+fx^2+gx+h$ 

Find meaning of the terms to perform multiplication of polynomials  $-4(x-2)(x+3)-5x^2-4$ 

(x-2)(x+3) are polynomials that need to be multiplied

-4 is the coefficient by which result of multiplication of polynomials is multiplied -4(x-2)(x+3). [R]-5x<sup>2</sup>-4 are terms that need to be combine with like terms of the result of multiplication.

## Perform operation on the left side of the equation following steps

- 1. multiply polynomials (x-2)(x+3)
- 2. multiply monomial by polynomial the result of multiplication in the first steep -4(x-2)(x+3)
- 3. insert the result of multiplication [R] into equation  $-4(x-2)(x+3)-5x^2-4 = [R]-5x^2-4$
- 4. simplify the result of multiplication by combining like terms

1.multiply polynomials (x-2)(x+3)

## find number of terms in each polynomial to be multiplied

each polynomial has two terms so this is the case multiplying a binomial by binomial (a+b)(c+d) binomial is an expressions with two terms

multiplying a binomial by a binomial is to use the mnemonic **FOIL** 

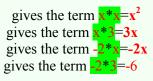
FOIL means to follows the order with which you multiply terms in the binomials. (a+b)(c+d)

**F** is for first Multiply the first terms of each binomial. ([a]+b)([c]+d) gives the term ac

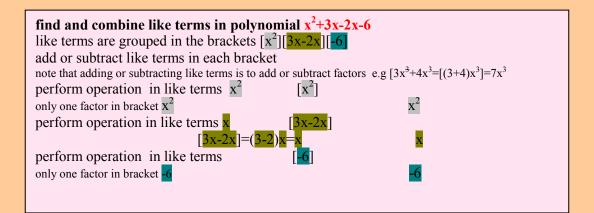
- **O** is for outer. Multiply the outer terms of each binomial ([a]+b)(c+[d]) gives the term ad
- I is for inner. Multiply the inner terms of each binomial (a+[b])([c]+d) gives the term be
- L is for last. Multiply the last terms of each binomial (a+[b])(c+[d]) gives the term bd

**multiply a binomial by a binomial** (x-2)(x+3) at first multiply the first terms of each binomial multiply the outer terms of each binomial multiply the inner terms of each binomial multiply the last terms of each binomial





the result of multiplication of polynomials (x-2)(x+3) is polynomial  $x^2+3x-2x-6$ 



the result of combining like terms is  $x^2+x-6$ 

2.multiply the result of multiplication  $x^2+x-6$  by monomial -4 $-4(x-2)(x+3)=-4(x^2+x-6)$ 

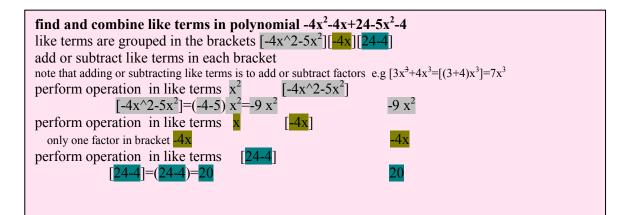
multiply each term in the polynomial (in parenthesis) ( $x^2+x-6$ ) by monomial -4 expression in parentheses has 3 terms multiplying a polynomial by a monomial is to use the distributive property of multiplication \* that is to multiply each term in the polynomial by the monomial eg. a(b+c+d+e)=ab+ac+ad+ae multiply coefficients -4\*1=-4 add factors 0+2=2 -4\*x<sup>2</sup>=-4x<sup>2</sup> multiply coefficients -4\*1=-4 add factors 0+1=1 -4\*x=-4x multiply coefficients -4\*-6=24 add factors 0+0=0 -4\*6=24

the result of multiplication is the polynomial  $-4x^2-4x+24$ 

3. insert the result of multiplication into equation  $-4(x-2)(x+3)-5x^2-4$ 

 $-4(\mathbf{x}-2)(\mathbf{x}+3)-5\mathbf{x}^2-4=-4(\mathbf{x}^2+\mathbf{x}-6)-5\mathbf{x}^2-4=-4\mathbf{x}^2-4\mathbf{x}+24-5\mathbf{x}^2-4$ 

4. simplify the result of multiplication by combining like terms  $-4x^2-4x+24-5x^2-4$ 



the result of combining like terms is polynomial  $-9x^2-4x+20$ 

The result of performing all operations on the left side of equation  $3x-4(x-2)(x+3)-5x^2-4$ is the polynomial  $-9x^2-4x+20$ **Insert this result into equation** -  $-9x^2-4x+20=-5x(2x-3)+5x^2-3$