**Chapter - FACTORING**

**Definitions:** Factoring, means changing a sum into a product.  
 Expanding, means changing a product into a sum.

A sum is made of separate terms separated by « + » or « – » outside of any brackets.

Examples:

1. is a sum of 3 terms: , et .
2. is a sum of 2 terms: et .
3. is a sum of 2 terms: et

A product has only one term that is made of factors that multiply each.

Examples:

1. is a product of 2 factors: et .
2. is a product of 4 factors: , , et that is double.

**Reminder on expanding:**

We use distributivity:

Examples :



We need to notice in particular that:

**Factoring by common factor:**

Your first reflex when factoring should be to look and see if all the terms have a common factor.

Examples:



ATTENTION: Factoring by common factor should always be the first technique to use!

**Factoring trinomials of the form :**

1. If Which means that there is “no number before” .  
     
   You already learned how to do it in grade 10.   
     
   Examples:  
   a)   
     
     
   b)   
     
     
     
   c)
2. If which means that there is a “number in front of” .  
   It’s more complicated! We still look for 2 numbers but they don’t give us the factored form right away:   
     
   Examples:  
   a)   
     
     
     
     
     
     
   b)   
     
     
     
     
     
     
     
   c)

**Factoring Special trinomials:**

When we expand certain products, we can notice some particular results:

1. **Differences of squares:**

**Definition:** Two expressions are said to beconjugates if one of them is a sum of two terms and the other one is the difference of the same terms.

Examples: a) et   
 b) et

IMPORTANT: When we multiply 2 conjugates expressions, we get a difference of squares.

Examples: a)   
  
 b)

As a consequence, when we notice a difference of squares, we can factor it into a product of conjugates.  
  
Examples:



ATTENTION: A *sum* of squares can’t be factored!!

1. **Perfect Squares :**

We call perfect squares an expression that will have 2 identical factors once factored.   
  
Example : 🡪 It’s a perfect square!  
  
To recognize a perfect square, you need 2 perfect squares terms and the double product!!

Examples :



**Other factoring techniques :** **Changes of variables :**

Example 1 :

Example 2 :

Your turn : a) p 222

Example 3 :

Your turn : b) p 222

Hwk : p 229 # 5, 6

**Why factor?**

Factoring is mostly useful to study the sign of an expression (see chapter 9) and solve equations (see 4.2).

Review : worksheet (from textbook 10) + p 258 # 6