

TEACHING UNIT VI

MATHS

LINEAR AND QUADRATIC EQUATIONS

INTERNATIONAL TEAMWORK AS A METHOD TO MAKE OUR
SCHOOLS INCLUSIVE OF DIVERSITY



TEACHING UNIT SPAIN III

MATHS: LINEAR AND QUADRATIC EQUATIONS

1. INFORMATION:

- a. **Date:** 20-26 September 2015
- b. **Level:** Secondary teaching (3º ESO)
- c. **Subject:** Maths
- d. **Theme:** First and second-degree equations
- e. **Teacher:** Maria Ángeles García García

2. AIMS/GOALS

- To give a lesson according to the collaborative work.
- To apply routines and skills of thinking.
- To Know concepts about equations: solution, degree of a equation....
- To solve linear and incomplete quadratic equations.
- To solve complete quadratic equations with formula.
- To compare forms of solving equations between different countries.

3. COMPETENCES/SKILLS

- **Mathematical competence and basic competence in science and technology:**
 - They resolve linear and quadratic equations
 - They apply equations to describe reality
- **Linguistic basic skills:**
 - They express the transformation of an equation into equivalent equations.
- **Learning to learn competence:**
 - They check the equation solution and reflect on the mistakes made.
- **Social and citizenship competence:**
 - They work actively in a team.
 - The students respect their turn to speak.

4. METHODOLOGY

- a. **Type of lesson:**
 - Participative
 - Team working
- b. **Type of interaction (organization in classroom):**
 - Working in groups of three students (one from each country).
- c. **Teaching aids:** Pc's, post it and equations activities.

5. TEACHING:

- a. **Contents:**
 - Operations with monomial and polynomial.
 - Concept of identity and equation.
 - Lineal equation: resolution and number of solutions.
 - Quadratic equation: types of quadratic equations, resolution and number of solutions.
- b. **Activities:**
 - Conceptual map about monomial (15 minutes).
 - Routine of thinking: K-W-L (Know-What-Learn) about linear equation (10 minutes).
 - Power -point of linear equation (10 minutes).
 - Working in groups: activities nº 1 and nº 2 (20 minutes).
 - Power point about quadratic equation (10 minutes).
 - Team work: activities nº 3 and nº 4 (25 minutes).
 - Activity: “ compare and contrast” first and second-degree equations (10 minutes).

6. EVALUATION:

- a. **Individual**
 - Consider the students 'skills in the collaborative work using the competences target.
 - Consider the personal thoughts and debates arisen after specific questions.
- b. **Group evaluation**
 - Analyze the answers written on the equations activities.

EQUATIONS

**LINEAR AND CUADRATIC
EQUATIONS**

Equations are part of the algebra. This word's origin is in the title “Al-jabr wa'l muqabalab” a book wrote in the 9th century by Al-Khuwarizmi.

In this book,we can see how to solve linear and quadratic equation.

DEFINITION:

- **EQUATION:**Is a equality between two algebraic expressions,true for a finite number values of the letters. This letters are called variables.
- **IDENTITY:**Is a equaility between two algebraic expressions, true for all values of the letters.

LINEAR EQUATION

Is an expression of the form:

$$\mathbf{ax=b \text{ con } a \neq 0}$$

STEPS TO SOLVE A LINEAR EQUATION

1. Remove brackets (,) [y {
2. Take out denominators
3. Put numbers in a member and letters in the other member.
4. Solve the equation

Number of solutions of a linear equation:

- $0x=0$ Infinite solutions
- $0x=a$ No solution
- $Ax=b$ One solution

QUADRATIC EQUATION

There are two types of quadratic equations:

- INCOMPLETES
- COMPLETES

ACTIVITY N° 1

$$a) 5(-x + 2) + 8x - 1 = -2(x + 4) + 19$$

$$b) \frac{x+6}{9} + \frac{x}{3} = 6$$

$$c) \frac{3x}{2} - \frac{4(x+1)}{3} = 18$$

$$d) \frac{5(x+1)}{4} - \frac{20-4x}{2} = 1$$

$$e) \frac{2(2x+3)}{3} - 1 = \frac{3(x-6)}{4} + 4$$

ACTIVITY N° 2

$$a) 5(x^2 - x - 6) + 2(x - 1)(x - 3) = 7(x - 1)(x + 2)$$

$$b) (3x + 2)(3x - 2) - 2 = 5x + 4 + 9x^2$$

$$c) \frac{(2x-2)^2}{5} + \frac{3x}{2} = \frac{4x(2x+1)}{10}$$

$$d) \frac{3-(x-1)(x-2)}{x} = 1 - x$$

$$e) \frac{5(4x-1)}{2} - \frac{2(x-2)}{4} = \frac{6(2x-3)}{5} - \frac{7}{10}$$

ACTIVITY N° 3

$$\text{a) } -4x^2 + 8 = 0$$

$$\text{b) } 2x^2 - 3x = 0$$

$$\text{c) } 5x^2 - 10x - 3 = -2x^2 - 11x - 3$$

$$\text{d) } x^2 - x - 12 = 0$$

$$\text{e) } 3x^2 - 15x + 8 = 0$$

ACTIVITY N°4

$$\text{a) } (x + 3)^2 - (x - 3)^2 = x^2$$

$$\text{b) } 6x^2 - 1 + \frac{2x(-x+3)}{3} = \frac{5x^2-2}{6} - 4x^2 + 2 + \frac{47}{6}$$

$$\text{c) } \frac{3(x^2-11)}{5} - \frac{2(x^2-60)}{7} = 36$$