-BaccalaurÉat gÉnÉral et technologique

# Session 2012

## ÉPREUVE SPÉCIFIQUE MENTION « SECTION EUROPÉENNE OU DE LANGUE ORIENTALE »

Académies de Paris-Créteil-Versailles

**Binôme : Anglais / Mathématiques**

**SEQUENCES**

**Sujet D3 -05**

*The first part of this page is a summary that can be useful to do the exercises.*

**Sequences**

A sequence is called an arithmetic progression where each term (except the first term) is obtained by adding a constant, called the **common difference**, to the previous term. If the first term is denoted by *a* and the common difference is *d* , then the arithmetic progression is , the  term is given by  and the sum to *n* is given by  .

**Quadratic equations**

The general quadratic equation is of the form , where *a, b* and *c* are constants and .

The two values of *x* which make  zero are called the roots of the equation.

The roots are given by .

 is the discriminant of the equation because it discriminates between the types of roots.

If >0, the roots are real and different.

 If =0, the roots are real and equal.

 If <0, the roots are complex.

**Exercise:**

To buy a piece of land and build a house, a couple takes out a loan. They are informed that after they have paid off their loan, the total amount they will have paid will be £81000. The first monthly repayment is £300. Each year the monthly repayment will be increased by £20.

Let be the amount paid back during the  year after the first repayment.

1. a) Find ,  and .

b) Explain why is an arithmetic progression and find its common difference.

c) Write  in terms of *n.*

d) Find .

1. Now consider the amount paid back after *n* years: .

a) Find ,  and .

b) Write  in terms of *n.*

1. The first monthly repayment was paid on 31 January, 2000

a) Find the year when the loan is repaid in full.

b) Find the total amount paid during this last year.