

## Holy Spirit University of Kaslik Faculty of Sciences

Department of Mathematics

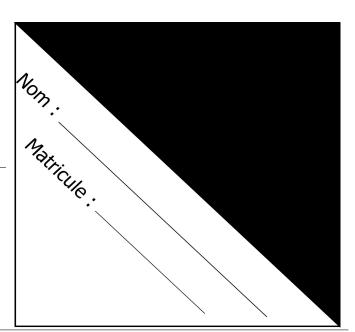
MAT418 - Numerical Methods

 Spring
 - 2019/2020

 Assignment 2
 - May 04

 Duration:
 - 35 mn

\* Calculator non programmable is authorized



 ${\bf Instructor:}\ {\rm Dr.}\ {\rm Grace}\ {\rm EL}\ {\rm KHOURY}$ 

## Question 1:

Here are the points (-1, 2), (0, 1), (2, 0).

- 1. Use Lagrange interpolation to find a polynomial of degree 2 or less whose graph passes through these points.
- 2. Find Newton polynomial that passes through these points.
- 3. Is it the same polynomial as the previous one? Justify theoretically your answer.
- 4. How many polynomials of each degree d = 1, 2, 3, 4, 5 pass through these points. Give an example of each degree when a polynomial exists.
- 5. Use a convenient method to find the polynomial Q(x) of degree 3 or less whose graph passes through the points (-1,2),(0,1),(2,0),(2.5,1).

## Question 2:

The aim of this exercise is to adjust by the least squares method, a cloud of n points  $(x_i, y_i)$  using the function hereunder:

$$y = ae^{bx}.$$

- 1. Develop the method that allows to determine the parameters a and b.
- 2. Find a and b for the following cloud of points: