Name and surname:

U number:

Calculus I - MAC 2311 - Section 001

Quiz 3

01/31/2018

Instructions: The total number of points of this quiz is 10. You will get an extra point if you solve correctly the last exercise.

1) [2 points] State the Intermediate Value Theorem.

2) [5 points] A residential complex near USF has a **12 feet deep** swimming pool, which is currently empty. With the end of the "winter" season the management decides to fill in it again. If

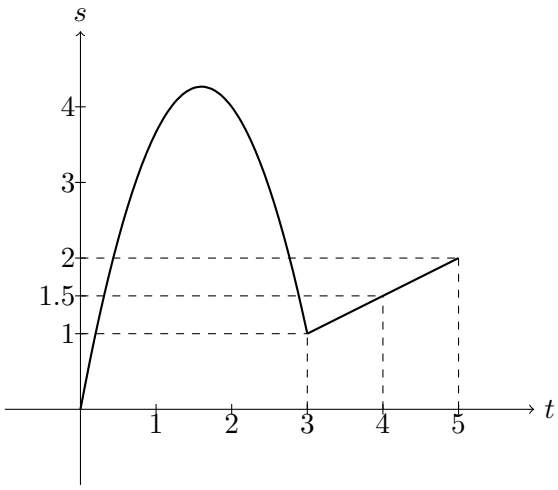
$$h(t) = \frac{1}{3}t^3 - t^2 + 4t$$

represents the swimming pool **water level** (in feet) as a function of time (in hours), prove that between $\mathbf{t = 0}$ hours and $\mathbf{t = 3}$ hours there is a time at which the swimming pool is **half** full.

3) [3 points] Compute the following limit and show all your work:

$$\lim_{x\to-\infty} \frac{-x^3-2x+3}{4x^3+5x^2+6} =$$

4) [Bonus] Let $s(t)$ be the position function (where the position is measured in meters and the time in seconds) whose graph is the following:



What is the instantaneous velocity at $t = 4$ seconds? Why? (Do not forget the unit of measure in your answer).