Exam 2
Review Sheet
April 17, 2018

The exam will cover sections 2.6, Chapter 3 and 4. Sections labelled optional that we did not cover will not be covered. (This also includes the moving frame and torsion from Section 3.2.) Below lists topics/questions you are likely to see. I also expect to include some True/False questions.

- Be able to prove Theorem 6.3 of section 2.6, and be able to use it.
- Be able to calculate the velocity, speed and acceleration of a path.
- Be able to calculate the length of a path
- Be able to calculate flow lines, sketch a vector field.
- Be able to calculate the gradient, divergence and curl and be able to use them.
- Find the first order and second order Taylor polynomial of a multivariable function
- Be able to identify critical points of a multivariable function, and determine their nature
- Be able to use Lagrange multipliers to identify critical points of a function subject to a given constraint(s). (It would be too cumbersome a test question to ask you to use the second derivative test for constrained local extrema.)
- Be able to use these techniques to solve regression problems (don’t memorize formulas, please!) and basic utility problems in economics.

Definitions to know:
- directional derivative of $f$ at $a$ in the direction of $v$, and know how to compute it using the dot product
- path, speed, acceleration
- vector field, flow line
• del operator, divergence of $F$ and the curl of $F$
• incremental change of $f$, total differential of $f$
• Hessian of a function
• local maximum, local minimum
• compact