1. The following definitions should be memorized:

- **a**. dot product, cross product and the geometrical interpretations of their absolute value and length respectively
- **b**. $\lim_{(x,y)\to(a,b)} f(x,y) = L$
- **c**. f is continuous at the point (a,b)
- **d**. partial derivative
- **e**. directional derivative
- **f**. differential of a function
- **g**. f is differentiable at a point (a,b)
- **h**. the graph of a function
- **i**. a level surface
- **j**. gradient of a function
- **k**. local maxima, local minima

2. Be able to do the following

- **a**. find equations of straight lines, and planes
- **b**. compute the projection of one vector onto another and explain why the projection formula is valid
- **c**. find tangent vectors to curves
- **d**. given velocity of a particle find its position, etc.
- **e**. find the length of a parametric curve
- **f**. evaluate limits, determine if a function is continuous at a point (a,b)
- **g**. compute directional derivatives
- **h**. explain why when f is differentiable that $D_{\vec{\eta}} f = \nabla f \cdot \vec{\eta}$.
- **i**. explain why when f is differentiable that the chain rule is valid
- **j**. explain why the gradient of a function is perpendicular to a level surface of the function.
- **k**. explain why $\nabla f = \vec{0}$ at a local extrema of f
- **l**. be able to use the "second" derivative test to determine the type of a stationary point. That is, is it a local max, local min, or saddle point.
- **m**. explain why ∇f points in the direction of greatest rate of change of f
- **n**. find equations of tangent planes to surfaces
- **o**. find absolute extrema of a function
- **p**. find extrema of a function subject to constraints on independent variables.