Topics for Test #2, MA242

1. Be able to compute first and second partial derivatives.
2. Be able to compute directional derivatives.
3. Be able to prove whether or not a multivariable function is **continuous** at a point.
4. Be able to prove whether or not a multivariable function is **differentiable** at a point.
5. Be able to use the chain rule to compute partial derivatives of composite functions.
6. Be able to find equation of:
   (a) the tangent plane to the graph $z = f(x, y)$ of a function of two variables
   (b) the tangent plane to the c-level surface $f(x, y, z) = c$ of a function of three variables
7. Know how to compute the gradient of a multivariable function.
8. Know what information the gradient of a function tells you about a given multivariable function.
9. Know how to find the linear approximation of a multivariable function near a point.
10. Know how to find the critical points of a function $f(x, y)$, and be able to use the second derivative test to determine if each critical point corresponds to a local maximum, local minimum or saddle point.
11. Know how to determine the global maximum and minimum values of a **continuous** function $f(x, y)$ on a closed and bounded region $D \subset \mathbb{R}^2$.

