Mathematical Analysis II
Question List for the Midterm.

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1. Domain and graph of a function of several variables
2. Partial of a function of several variables: definition, examples.
3. Directional derivatives: definition, relation to the partial derivatives.
4. Gradient, its relation to partial and directional derivatives.
5. The formula of small increments
6. The tangent plane to a graph of a function: definition, equation.
7. Higher order partial derivatives: definition, examples.
8. The Schwartz lemma.
9. The Hessian of a function: definition, relation to second derivative of a section of a function in a given direction.
10. Sufficient condition for local convexity/ concavity.
11. Positive/negative definiteness of a symmetric matrix: definition and the Sylvester criterium.
12. Local extrema: definition and necessary condition in the terms of the gradient
13. Classification of critical points. Sufficient conditions for a critical point to be a local minimum/local maximum
14. Local extrema under given constraints: definition, the Larange multipliers method