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Math 223 - Multivariable Calculus

Topics Covered

Midterm 1

- Points and Vectors in $\mathbb{R}^n$
  - Vectors versus points in $\mathbb{R}^n$.
  - Algebraic and geometric properties of vectors in $\mathbb{R}^2$, $\mathbb{R}^3$, and $\mathbb{R}^n$.
  - Dot and cross products: how to compute and properties of each.
  - Lengths of and angles between vectors.
  - Orthogonal projection of vectors.
  - Planes and lines in $\mathbb{R}^n$: how to compute and express. The equation of a plane in $\mathbb{R}^3$.
  - Drawing/recognizing familiar quadric surfaces.

- Calculus with Multivariable Functions
  - Parametrized curves and arc length.
  - Multivariable functions: domain and range.
  - Graphing functions $f : \mathbb{R}^2 \to \mathbb{R}$: using level curves and/or cross-sections.
  - Level surface of a function $F : \mathbb{R}^3 \to \mathbb{R}$.
  - Limits and continuity of multivariable functions.
  - Partial derivatives: computing and interpreting. Higher-order partials.
  - Differentiability of $f(x, y)$. Tangent planes to graphs. Using linearlization to approximate $f(x, y)$.