

The second exam will be administered in class **Friday, March 1st**. No makeup exams will be given. The exam will cover sections 14.3 - 14.5 and 15.1 - 15.5. No electronic devices will be allowed including cell phones, laptops, or calculators, but you may bring a 3×5 inch notecard with notes and/or formulas on the front and back. **You must bring your student ID to the exam.** Scratch paper will be provided.

You should study old homework, quizzes, lecture notes, and these sections of the textbook. You may also find it helpful to do problems in the textbook for each section and the Chapter 14 Review and Chapter 15 Review.

Skills List

In general you are expected to know and understand all definitions and theorems covered. The following is a list of skills you will likely need to be able to apply on the exam. This list is meant to be a guide and is not exhaustive. In particular, you should be able to:

- Compute and interpret arc length and curvature for a curve.
- Compute and interpret the Frenet frame, i.e. the $\{\mathbf{T}, \mathbf{N}, \mathbf{B}\}$ -frame for a curve.
- Find the osculating plane for a curve at a given point.
- Find and interpret the velocity, acceleration, and speed of a particle given a position function.
- Find the velocity and position functions for a particle given its acceleration, initial velocity, and initial position.
- Find the radial and tangential components of acceleration for a particle.
- Identify the graph and level curves of a function of two variables.
- Identify the domain of a function of multiple variables.
- Find a limit of a function of two variables or show that it does not exist.
- Determine the set of points at which a function of two variables is continuous.
- Compute and interpret first order and higher order partial derivatives.
- Identify signs of first order and higher order partial derivatives from a contour plot.
- Find the equation of the tangent plane to a surface and use it to approximate values of a function.
- Find the total differential and use it to approximate the change in outputs of a function.
- Apply the chain rule in multiple variables to find derivatives and partial derivatives.
- Compute and interpret the directional derivative of a function in a direction \mathbf{u} .
- Compute and interpret the gradient of a function of two variables or three variables.
- Find the maximum rate of change of a function and the direction in which it occurs.
- Find the direction of the gradient for a function at a point given a contour plot.
- Use the gradient to find the equation of the tangent plane to a surface.