

Math 12002 Final Exam Review

The Final Exam will be given in MSB 106 (our usual classroom) on Tuesday, December 13, 2016. It will be comprehensive and cover Chapters 1–5 and section 7.1, with each chapter having about the same weight. The best way to review will be to go over problems on the previous exams. Major topics are outlined below, but for more detail, please look back at the review sheets for the individual exams. In addition to a few multiple choice questions at the beginning, you will be asked to discuss one or more of the topics below in part 7.

1 Functions

All topics below refer to any combination of power functions, trigonometric functions, exponentials, logarithms, and inverse trigonometric functions.

2 Continuity

Definition of continuous at $x = a$; determine if a given function is continuous at a given point and explain why; implications of continuity for graphs.

3 Limits

Definition of limit; properties of limits; compute limits at a point including one-sided limits, limits at infinity, and infinite limits; various techniques including canceling, dividing numerator and denominator by powers of x , computing left and right hand limits, l'Hôpital's rule, etc.

4 Derivatives

Definition of derivative; properties of derivatives; compute derivatives using the definition; compute derivatives using properties including product rule, quotient rule, chain rule, etc; derivatives of specific functions; implicit differentiation; applications including equations of tangent lines, rates of change, related rates, max/min.

5 Curve Sketching

Application of derivatives to finding intervals of increase, intervals of decrease, local and absolute max/min, intervals of concavity, points of inflection; application of limits to finding vertical and horizontal asymptotes; graphing.

6 Integrals

Definition of the definite integral; relation to area; properties of integrals; Fundamental Theorem; compute indefinite integrals using integration formulas and/or substitution; compute definite integrals using FTC and/or areas; applications including areas between curves, finding functions given rate of change and specific values, finding change of functions given rate of change, average value.

7 Topics for Discussion Questions

1. The relationship between the derivative and the slope of a tangent line.
2. The relationship between the derivative and instantaneous rate of change.
3. The role of limits in a and b.
4. The relationship between the definite integral and area.