Math 2 Final Exam Review Sheet

The exam will be based on any material covered in the course, as well as any necessary techniques from Math 1 (e.g. the Chain Rule, Implicit Differentiation, etc.). The problems listed are only representatives of the types of problems that could appear on the exam. It is by no means an exhaustive list, hence there could be other types of problems appearing on the exam. However, going through these problems should help you determine which topics you need to review more thoroughly.

§12.1: Arcs, angles and triangles
- Angles degrees and radians
- Converting degrees and radians
- Arc length
- Area of a Sector
- Right triangle trig

§12.2: Sine and Cosine Functions
- The unit circle
- Evaluating $\sin\theta$, $\cos\theta$, $\tan\theta$, $\csc\theta$, $\sec\theta$, $\cot\theta$ for certain angles
- Graphs of sine and cosine
- Modified sine and cosine graphs (shifting, stretching, amplitude, period).

§12.3: Derivatives of Trigonometric Functions
- Definitions of cotangent, cosecant, and secant
- Derivatives of $\sin x$, $\cos x$, $\tan x$, $\cot x$, $\sec x$, $\csc x$.
- Derivatives of functions involving trig functions (i.e., using chain rule, product rule, quotient rule, etc)

PROBLEMS: pp. 403-404, 1,3,5,7,9,11ab,13,15,17

Handout: Inverse Trigonometric Functions
- Inverse Functions and their graphs
- Definition of inverse sine, inverse cosine and inverse tangent
- Computing with inverse trig functions
- Derivatives of Inverse Trig Functions
- Derivatives of functions involving inverse trig functions

PROBLEMS: (1) Find $\cos^{-1} 1$, $\sin^{-1}\left(-\dfrac{1}{2}\right)$ $\tan^{-1}(\sqrt{3})$

(2) Find $\cos(\sin^{-1} x)$

(3) Prove that $\dfrac{d}{dx}\left(\sin^{-1} x\right) = \frac{1}{\sqrt{1-x^2}}$.

(4) Differentiate $\frac{1}{\sin^{-1} x}$ and $x\tan^{-1}\sqrt{x}$

(5) Find the derivative of $(\cos^{-1} t)/t$,

§7.1 AND CLASS NOTES: Antiderivatives
- Definition of an antiderivative and the general antiderivative of a function

- Sum and constant rules of antiderivatives
- Antiderivative of
    - (1) x^r, $r \neq -1$
    - (2) x^{-1}
    - (3) e^x
    - (4) $\sin x, \cos x$
- Antiderivatives that result in trig or inverse trig functions
- Finding particular antiderivatives (i.e., antiderivatives with side conditions, solving for C).

§7.2: The Substitution Rule
- Statement of the rule
- Applications of the rule to various examples
- Using long division to simplify an expression

§7.3: Some Integration Techniques
- Integration by parts. Statement of rule and application to examples.
- Simplifying expressions using partial fractions and integrating them.

§12.4 AND CLASS NOTES: Integration of Trigonometric Functions
- Integration of trig and inverse trig functions using substitution
- Integration of trig and inverse trig functions using integration by parts

§7.4: Differential Equations
- Separation of variables
- Finding particular solutions when given initial conditions
- Solving differential equations that involve trig functions

PROBLEMS: pp. 242-3:1,3,5,7,13,15,17,19; pp. 403-404:21,25

§8.1: Area and the Definite Integral
- Area formulas of basic shapes (triangles, squares, circles, trapezoids, etc)
- Definition of the definite integral in terms of area
- Uses of symmetry

§8.2: The Fundamental Theorem of Calculus
- Statement and application of theorem
- Properties of definite integrals
- Definition of the average value of a function

§8.3: Calculation of Definite Integrals
- Using substitution in computing definite integrals
- Using integration by parts in computing definite integrals

§8.4: The Definite Integral as a Limit
- Limit definition of the definite integral
- Sigma (Σ) notation
- Formulas involving the sum of i and i^2
- Evaluating definite integrals using the limit definition

PROBLEMS: pp. 271-3 1-5 odd, 9-21 odd, 31,35,37 pp. 403-4: 23,29,33

§14.1 AND CLASS NOTES: Numerical Integration
- Approximating definite integrals using
    (1) Right hand Riemann Sums
    (2) Left hand Riemann Sums
    (3) Trapezoidal Rule
    (4) Parabolic Rule
- Finding bounds for the errors of the trap rule and parabolic rule.

PROBLEMS: p. 468: 1,3

§9.1: Area Between Two Curves
- Vertical slicing into rectangles
- Find endpoints of an interval
- Breaking integral into two parts

§9.2 AND CLASS NOTES: • Computing volumes of solids of revolution about x-axis, y-axis, line $x = c$ or line $y = c$ for c a constant.
- Using method of disks or washers to compute of solids of revolution
- Using slicing and cross-sections to compute the volumes of other solids.

PROBLEMS: p. 308: 1-11 odd