**The Final Exam**

- two hours
- 10 questions @ 20 marks each = 200 marks
- one question will be ten True/False
- no proof type questions
- pencil and brain only; no *Mathematica*, no calculators, no formula sheets
- know the basic forms for the derivatives and integrals
- The following will be provided:

  A circular cone with base radius $r$ and height $h$ has:
  Volume $= \frac{\pi}{3}r^2h$, Surface Area $= \pi r\sqrt{r^2+h^2}$.
  A sphere with radius $r$ has:
  Volume $= \frac{4}{3}\pi r^3$, Surface Area $= 4\pi r^2$.

**Chapter 1 & 2**

- Knowledge of these chapters is essential to doing well in the following chapters

**Chapter 3: Differentiation Rules**

- constant multiple, power, sum, difference, exponential rules 3.1
- product, quotient rule 3.2
- derivatives of trig functions 3.3
- chain rule 3.4
- implicit differentiation 3.5
- logarithmic differentiation 3.6
- derivatives of Log function 3.6
- related rates 3.9
- linear approximation and differentials 3.10

**Chapter 4: Applications of Differentiation**

- graphing using the derivatives 4.3 & 4.5
- L'Hospital's Rule to evaluate limits 4.4
- optimization problems 4.7
- antiderivatives 4.9

**Chapter 5: Integration**

- Riemann sums (area under curve) 5.1
- definite integrals 5.2
- Fundamental Theorem of Calculus 5.3
- indefinite integrals 5.4
- displacement and distance traveled 5.4
- substitution to evaluate integrals 5.5

**Chapter 10: Parametric Equations**

- curves defined by parametric equations 10.1
- the derivative (not integrals) of a curve defined by parametric equations 10.2

**Handout: Curves and Surfaces in $\mathbb{R}^3$**

- $\mathbb{R}^3$, and a three dimensional coordinate system
- explicit representation of surfaces in $\mathbb{R}^3$
- traces in $zx$-plane and $zy$-plane
- contour plots
- parametric representation of space curves in $\mathbb{R}^3$
- partial derivatives of explicit functions $z = f(x, y)$
- extrema in $\mathbb{R}^3$

**Advice on Final Exams Preparation**

- Create a study schedule for the week prior to exams which blocks out time when you will study for each exam you have.
- Many short study sessions is better than long cram sessions the day before the exam.
- Review tests, webwork, homework solutions and practice test questions posted on the course webpage; focus on tests initially since the final will have questions similar to those.
- Create practice "tests" for yourself, maybe three or four questions which you have the solution to, and then answer them without reference to the text. Do not move on to other questions until you have mastered these ones. You might consider imposing a time limit on these mini-tests.
- Refer back to any study notes you made for tests as you review; make new study notes as necessary.
- Write short sentences to describe how to solve complicated problems (like related rates, optimization problems, integration by substitution, etc).
- Branch out and do other types of problems that appeared less frequently throughout the section.
- Make sure you are very comfortable with taking derivatives and doing integrals, as these are important skills to master in Calculus I and will occur in the vast majority of the problems.
- Get as much sleep as possible while you study for tests. Come to your exams well rested, and mentally sharp.
- Study in an environment that mimics the environment the test will take place in. It should be quiet and clear of clutter.
- If you do study in groups, also study alone so you can focus on the types of questions you need to work on.
- Come and talk with me (email me to set an appointment if necessary) if there are questions you have.