Math 1B
Post Midterm 3 Review and Final Exam Comments

Use the study guides from midterms 1, 2 and 3 to review chapters 3.11, 5, 6, 7 (except 7.7) and 8.1-8.3.

The following questions act as a review for the 7.7 and chapter 9 material which will be included.

[1] Estimate $\int_1^9 f(x)\,dx$ using $n = 4$ and each of the methods below.

x	0	1	2	3	4	5	6	7	8	9	10
$f(x)$	7	9	10	13	12	10	7	3	2	2	5

[a] Midpoint Rule [b] Trapezoidal Rule [c] Simpson's Rule

[2] Find [i] the percentage error [ii] bounds on the error

when each of the following rules are used to approximate $\int_1^8 \frac{4}{\sqrt[3]{x}}\,dx$ with $n = 10$.

[a] Midpoint Rule [b] Trapezoidal Rule [c] Simpson's Rule

[3] Solve the following initial value problems.

[a] $\frac{dy}{dx} = \frac{2y}{x^3}$, $y(1) = 1$ [b] $\frac{dy}{dx} = \frac{1+y^2}{\cos^2 x}$, $y(0) = 1$

[c] $\frac{dy}{dx} = e^{2x+y}$, $y(0) = 1$ [d] $\frac{dy}{dx} = \frac{1}{x^2 y}$, $y(1) = 4$

[4] Use Euler's method to approximate the value of $y(2)$ for each initial value problem using the specified value of h.

[a] $\frac{dy}{dx} = x + y^2$, $y(1) = 1$, $h = 0.5$ WITHOUT USING A CALCULATOR

[b] $\frac{dy}{dx} = \cos x + \sin y$, $y(0) = 0$, $h = 0.2$

[c] $\frac{dy}{dx} = x^2 - 2y^2$, $y(0) = 0$, $h = 0.1$

The final exam will be approximately 50% multiple choice, with no partial credit for those problems (since you won't have to show work). There will be a no-calculator section and a calculator-allowed section.
The questions on volume, work and hydrostatic force will all be on the multiple choice calculator-allowed section. You will be expected to simply set up the integrals, then use fnInt to find the correct answer. That means **you must be able to set up the integrals correctly**, and **you must be able to use your calculator correctly**.

REMEMBER: I MUST SEE YOUR ID BEFORE YOU CAN TAKE THE FINAL EXAM.

[1] [a] 62 [b] 63 [c] $63\frac{1}{3}$

[2] [a] [i] 0.136% [ii] $\frac{343}{1350}$

[b] [i] -0.277% [ii] $\frac{343}{675}$

[c] [i] -0.019% [ii] $\frac{941192}{72900000}$

[3] [a] $y = e^{1-\frac{1}{x^2}}$ [b] $y = \tan\left(\frac{\pi}{4} + \tan x\right)$

[c] $y = 1 + \ln 2 - \ln(2 + e - e^{2x+1})$ [d] $y = \sqrt{18 - \frac{2}{x}}$

[4] [a] 4.75 [b] 2.3783 [c] 1.2565