SIMON FRASER UNIVERSITY

MATH 155 Midterm 2

17 March 2010, 08:30–09:20

Last Name ____________________

Given Name(s) ____________________

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Signature ____________________

INSTRUCTIONS

1. **Do not open this booklet until told to do so**.
2. Fill out the box in the upper right corner of this page.
3. This exam has 6 questions on 6 pages. Check to make sure that your exam is complete.
4. No book, paper or device other than usual writing instruments, this examination booklet, and a scientific calculator are allowed. **Calculators with graphing and/or symbolic computation capabilities are not allowed.**
5. **During the examination, speaking to, communicating with, or exposing written papers to the view of other examinees is forbidden**.
6. You may use the **reverse side of the previous page** for rough work or if you run out of space.
7. **You may lose marks if your explanations are incomplete or poorly presented.**
8. **Stop writing when you are instructed to do so. Failure to follow instructions may result in penalties.**

Question	Maximum	Score
1	7	
2	8	
3	7	
4	4	
5	7	
6	7	
Total	40	

[7] **1.** Find $\displaystyle\int \frac{x+11}{x^2+4x-5}\,dx$.

2. For each of the following two improper integrals, determine whether it is convergent or divergent. If the integral is convergent, determine its value.

[4] (a) $\displaystyle\int_1^4 \frac{2}{(x-3)^2}\,dx$

[4] (b) $\displaystyle\int_5^\infty \frac{2}{(x-3)^2}\,dx$

[7] **3.** Evaluate $\displaystyle\int x^2 \cos x \, dx$.

[4] **4.** Use the trapezoidal rule with $n = 4$ intervals to approximate the value of $\displaystyle\int_3^5 x^2\,dx$. Compare the approximation with the exact value of the integral.

[7] **5.** Solve the differential equation

$$\frac{dy}{dx} = 2\sqrt{y}$$

with the initial condition $y(0) = 4$.

6. Let r and K be positive constants. The differential equation

$$\frac{dN}{dt} = rN\left(1 - \frac{N}{K}\right)$$

describes a well known growth model.

[3] (a) Give the name of the model and describe the meaning of the symbols in the differential equation.

[4] (b) Let $r = 0.1$ and $K = 100$. Find the equilibria of the differential equation and the eigenvalues associated with them. Use the eigenvalues to determine the stability of the equilibria.