Math 152 – Calculus II, Fall 2006
First Midterm
October 4, 2006, 8:30 – 9:20

Last Name:	
First Name:	
SFU ID (email or numeric):	

1. DO NOT LIFT UP THE COVER PAGE UNTIL INSTRUCTED.
2. No calculators are allowed.
3. This test is comprised of 6 pages (including cover page) and one formula sheet at the back.
4. Once the test begins, please check that all pages are intact.
5. Do ALL questions.
6. Clearly explain your answer. No credit will be given for just writing down the answer.
7. If the answer space provided is not sufficient, write your answer on the back of the previous page. Clearly mark the question number.
8. Good luck.

Question	Points	Score
1	4	
2	2	
3	6	
4	2	
5	6	
6	5	
Total:	25	

1. (a) (2 points) Let $a < b$ and let $f(x)$ be a continuous function on $[a, b]$. Give the definition of

$$\int_a^b f(x)dx$$

in terms of a limit of a Riemann sum. Take care to define any auxiliary symbols, like x_i^* and Δx, that you introduce.

Answer

(b) (2 points) Let $f(x) = (x-1)^3 + 1$. Compute R_4 (the 4 term Riemann sum with sample points taken at the right ends) for $\int_0^2 f(x)dx$.

Answer

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2. (2 points) Let R_n be the n term Riemann sum for $\int_0^2((x-1)^3+1)dx$ with sample points taken at the right end points. Will R_n be larger or smaller than $\int_0^2((x-1)^3+1)dx$? Argue why.

Answer

3. (a) (3 points) Compute

$$\int_0^1 x\, e^{-x^2} dx$$

Answer

(b) (3 points) Compute

$$\int_{-1}^1 (\sin(x) + \frac{1}{(x-2)^2}) dx$$

Answer

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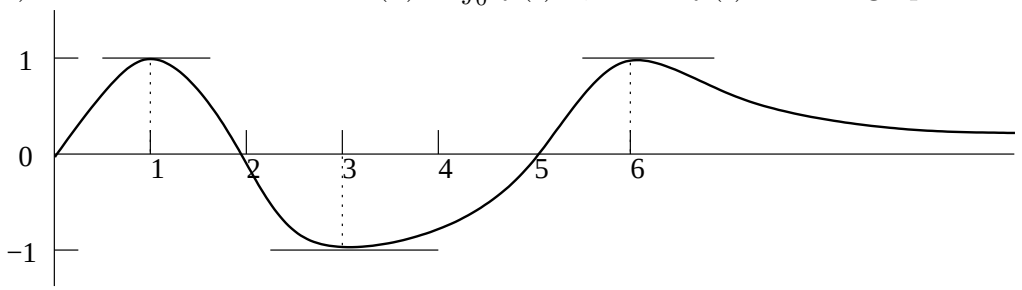
4. (2 points) Consider the function $F(x) = \int_0^x f(t)dt$, where $f(t)$ has the graph below:



For what value of x does $F(x)$ attain its absolute minimum on $[0, 6]$?

Answer

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5. Mark each of the following statements **T** (true) or **F** (false) or leave blank: 2 points for a correct answer, 1 for blank, 0 for an incorrect answer. You do not have to justify your answer here.

   (a) (2 points) T/F: ☐. If $f(x), g(x)$ are continuous functions on $[a, b]$ then

$$\int_a^b f(x)g(x)dx = \left(\int_a^b f(x)dx\right)\left(\int_a^b g(x)dx\right).$$

   (b) (2 points) T/F: ☐. If $f(x)$ is a continuous function on $[a, b]$ then

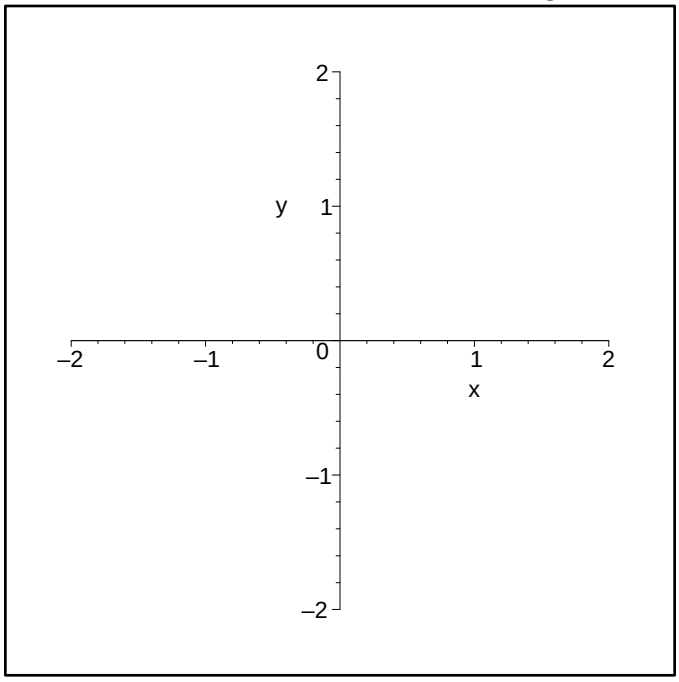
$$\left|\int_a^b f(x)dx\right| \leq \int_a^b |f(x)|\,dx.$$

   (c) (2 points) T/F: ☐. If $f(u)$ and $g(x)$ are continuous functions then

$$\int_a^b f(g(x))dx = \int_a^b g(u)du.$$

6. Consider the curve $x = y^2$ and $y = x^2$.

(a) (1 point) Make a sketch of the two curves in in the diagram below.



(b) (2 points) Write down an integral that computes the area enclosed between the two curves.

Answer

(c) (2 points) Compute the area enclosed between the two curves.

Answer
