

Math 152
Exam 1
January 29th, 2010

Name: _____

1. Your exam contains 5 questions and 4 pages; Please make sure you have a complete exam.
2. The entire exam is worth 100 points. Point values vary and these are indicated on each problem. You have 50 minutes for this exam.
3. Make sure to **ALWAYS SHOW YOUR WORK**; you will not receive any partial credit unless all work is clearly shown. If in doubt, ask for clarification.
4. Put a box around your final answer where applicable.
5. Leave answers in exact form (as simplified as possible).
6. You are allowed one 4" × 6" notecard (both sides).
7. You may use a calculator for this exam, but I will not give credit for work done solely on a calculator (aside from arithmetic).
8. If you need extra space, attach an extra sheet to the back of the exam and clearly indicate this.

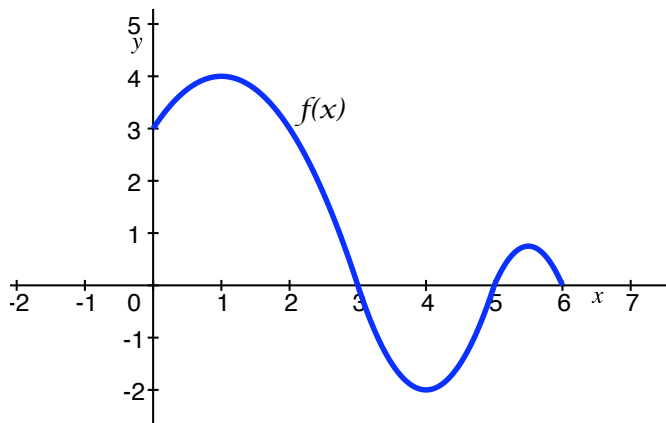
Problem	Total Points	Score
1	11	
2	15	
3	8	
4	46	
5	20	
Total	100	

1. (11 pts.) The table below gives the rate of cheese production in a factory measured at particular times. The rate is decreasing.

Time (hours)	0	3	6	9	12	15
Rate of Cheese Production (millions of pounds/hour)	12	11	10.5	10	9	8

Using the 3-hour time intervals, give **upper and lower estimates** for the total amount of cheese produced during the 15 hours. (Include units in your answer.)

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2. (15 pts.) The function $f(x)$ is shown below. Define $g(x) = \int_0^x f(t) dt$.



- (a) (5 pts.) For what x -values is $g(x)$ increasing?

- (b) (5 pts.) At what x -value does $g(x)$ have an absolute maximum?

- (c) (5 pts.) Approximate $g'(2)$.

3. (8 pts.) Write the following sum using sigma notation: $\sqrt{\frac{1}{2}} + \sqrt{\frac{1}{4}} + \sqrt{\frac{1}{6}} + \sqrt{\frac{1}{8}} + \sqrt{\frac{1}{10}} + \sqrt{\frac{1}{12}}$

4. (46 pts.) Evaluate the following integrals.

(a) (14 pts.) $\int \cos x \cdot (\tan x + 2) dx$

(b) (16 pts.) $\int e^x \cdot \sqrt[4]{8e^x - 1} dx$

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(c) (16 pts.) $\int_e^4 \left(3 + \frac{1}{t \ln t}\right) dt$

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5. (20 pts.) Find the area of the region between $y = |x - 1|$ and $y = 11 - x^2$ for $x \geq 0$.
(Sketch a rough graph of the region.)