MATH 231 Test 1 Spring 2011

Name ________________________________

(circle your TA discussion section)

▷ CD1, TR 9:00-9:50, Vicki Reuter
▷ CD3, TR 12:00-12:50, Ilkyoo Choi
▷ CD5, TR 9:00-10:50, Paul Spiegelhalter
▷ CD7, TR 12:00-12:50, Nathan Orlow
▷ CD9, TR 3:00-3:50, Grace Work

▷ ED1, TR 2:00-2:50, Yat Sen Wong
▷ ED3, TR 4:00-4:50, Yat Sen Wong
▷ ED5, TR 12:00-12:50, Bolor Turmunkh
▷ ED7, TR 4:00-4:50, Hannah Kolb

• Sit in your assigned seat (shown below).
• Do not open this test booklet until I say START.
• Turn off all electronic devices and put away all items except a pen/pencil and an eraser.
• Unless otherwise stated, you must show sufficient work to justify each answer.
• While the test is in progress, we will not answer questions concerning the test material.
• Quit working and close this test booklet when I say STOP.
• Quickly turn in your test to me or a TA and show your Student ID.
1. (8 points) Evaluate the following integral. Be sure to use proper notation in each step of the work used to justify your answer.

\[ \int_{5}^{\infty} e^{-2x} \, dx \]

2. (4 points each) Determine whether the following integrals converge or diverge. No partial credit will be given for this problem. You do not need to show any work.

   (a) \[ \int_{1}^{\infty} \frac{1}{\sqrt{x}} \, dx \]

   (b) \[ \int_{1}^{\infty} \frac{x^3}{x^5 + 5x + 3} \, dx \]

   (c) \[ \int_{1}^{\infty} \frac{x^5 + 1}{x^6} \, dx \]
3. (12 points each) Evaluate the following integrals.

(a) \( \int \sec^3 x \tan x \, dx \)

(b) \( \int x^4 \ln x \, dx \)
(c) \[ \int \frac{4x + 3}{x^2 + 1} \, dx \]
(d) \[ \int \frac{12}{(4 - x^2)^{3/2}} \, dx \]
(e) \[ \int \frac{dx}{x^2 + 6x + 13} \]
4. (8 points) Set up, but do not evaluate, an integral which represents the length of the curve
\[ f(x) = x^3 + 4x \] from \( x = 0 \) to \( x = 3 \).
Students – do not write on this page!

1. (8 points) ______________________

2. (12 points) ______________________

3a. (12 points) ______________________

3b. (12 points) ______________________

3c. (12 points) ______________________

3d. (12 points) ______________________

3e. (12 points) ______________________

3f. (12 points) ______________________

4. (8 points) ________________________

TOTAL (100 points) ________________