

Math 21B-B, Fall 2020
October 23, 2020

TAKEHOME MIDTERM 1

Due: Today 10/23 at 15:00

NAME(use CAPITAL letters, *first name first*):_____

NAME(sign):_____

ID#:_____

HONOR STATEMENT: By signing this paper, I hereby declare that I solved this exam by my own, without any external collaboration (like friends, internet solutions, etc). If needed, I am allowed to use our lecture notes only. I understand that the main purpose of this exam is to show how much I have learned in this course, holding myself to a high standard of academic integrity, and that suspected misconduct on this exam will be reported to the Office of Student Support and Judicial Affairs and, if established, will result in disciplinary sanctions up through Dismissal from the University and a grade penalty up to a grade of 'F' for the course.

Instructions: Each of the 4 problems has equal worth. Read each question carefully and answer it in the space provided, or answer it in a separate paper and sign that paper; it is optional to print this exam. **YOU MUST SHOW ALL YOUR WORK TO RECEIVE FULL CREDIT.** Clarity of your solutions may be a factor when determining credit. Unless directed to do so, do *not* evaluate complicated expressions to give the result as a fraction or a decimal number. If you are using any of the problems in the textbook, then you have to solve it.

To deliver: Submit your solutions on Canvas/Gradescope, as you did with the HW1. Sign and submit the honor statement (write it down by hand, if needed).

Make sure that you have a total of 5 pages (including this one) with 4 problems.

1	
2	
3	
4	
TOTAL	

1. Use Riemann sums (and *not* the FTC) to calculate

$$\int_{-2}^2 (5x^3 - 8/3) dx.$$

2. Determine whether the following statements are True or False. Justify your answers.

(a) *(12pts)* If f and g are continuous functions over $[1, 2]$ then

$$\int_1^2 f(x)g(x) dx = \left(\int_1^2 f(x) dx \right) \cdot \left(\int_1^2 g(x) dx \right).$$

(b) *(13pts)* The function $g : [\pi, 2\pi] \rightarrow \mathbb{R}$ given by

$$g(x) = \int_{\pi}^x (\sin t - 20e^{t^2}) dt$$

has a local minimum at $x = 3\pi/2$.

3. Compute the following integrals.

(a) $\langle 12pts \rangle \int \frac{5 du}{u(1 + \ln^2 u)}$

(b) $\langle 13pts \rangle$

$$\int_0^1 \frac{dz}{\sqrt[3]{(7-5z)^2}}$$

4. (a) $\langle 13pts \rangle$ Find the area of the region bounded above by the x -axis and below by the curve $y = x^2(x^2 - 1)$, that means, between $x = -1$ and $x = 1$.

- (b) $\langle 12pts \rangle$ Find the area of the region in the first quadrant that is bounded by the curve $x = (y - 1)^2$ and the line $x = 4$.