

## MATH 2B – MIDTERM 1

Name: \_\_\_\_\_

Student ID: \_\_\_\_\_

Discussion Section time: (please circle)

8 – 9 AM

11 – 12 PM

**Instructions:** Welcome to Midterm 1! You have 50 minutes to take this exam, for a total of 100 points. This is a closed book and closed notes exam and calculators and/or portable electronic devices such as cell phones are not allowed and should be turned off during the entirety of the exam. Remember that you are not only graded on your final answer, but also on your work. If you need to continue your work on the back of the page, clearly indicate so, or else your work will be discarded. **Please also write your name on the back of the exam.** May your luck be integrable! :)

**Academic Honesty Statement:** I hereby certify that the exam was taken by the person named and without any form of assistance. I hereby acknowledge that any form of cheating will be subject to disciplinary consequences, pursuant to section 102.1 of the UCI Student Code of Conduct.

**Signature:** \_\_\_\_\_

1		25
2		25
3		25
4		25
Total		100

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Date: Wednesday, January 31, 2018.

1. (25 points) Use the **definition** of the integral (in terms of Riemann sums) to evaluate

$$\int_1^3 (2x + 3) dx$$

You are allowed to use the following facts:

$$\sum_{i=1}^n 1 = n, \quad \sum_{i=1}^n i = \frac{n(n+1)}{2}, \quad \sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6}, \quad \sum_{i=1}^n i^3 = \frac{n^2(n+1)^2}{4}$$

2. (25 points total) Find the following:

(a) (15 points)

$$\int_0^1 x^3 \sqrt{1-x^2} dx$$

(b) (10 points) The derivative (with respect to  $x$ ) of

$$\int_{x^2}^3 \sin\left(\frac{1}{t}\right) dt$$

3. (25 points)

(a) (15 points) Find the area of the region enclosed by the curves  $y = x^2$  and  $y = 2x$ .

(b) (10 points) Set up, **but do not evaluate**, the volume of the solid obtained by rotating the region in (a) about the  $x$ -axis ( $y = 0$ ).

4. (25 points) The base of a solid is a circular disk of radius 1. Cross-sections (perpendicular to the base) are squares. Find the volume of that solid.

(Scrap paper)