

College of the Holy Cross, Spring 2020
Math 136, section 1, Midterm Exam 1
Friday, February 21

Your Name: _____

Instructions: For full credit, you must show *all work* on the test pages and place your final answer in the box provided for the problem. Use the back of the preceding page if you need more space for scratch work. The numbers next to each part of the questions are their point values.

The trigonometric reduction formulas are provided on a separate sheet

Please do not write in the space below

Problem	Points/Poss
I	/ 20
II	/ 30
III	/ 30
IV	/ 20
Total	/100

I.

A. (10) Evaluate the L_4 Riemann sum for $f(x) = e^{x^2}$ on the interval $[a, b] = [0, 2]$.

$L_4 =$

B. (10) The following limit of a sum would equal the definite integral $\int_a^b f(x) dx$ for some function $f(x)$ on some interval $[a, b]$. What function and what interval?

$$\lim_{N \rightarrow \infty} \sum_{j=1}^N \left(\sqrt{\left(\frac{5(j-1)}{N} \right)^3 + 4} \right) \cdot \frac{5}{N}.$$

$f(x) =$

$[a, b] =$

II. All parts of this problem refer to:

$$A(x) = \int_0^x t(5-t) dt$$

- A. (10) Is $A(4)$ a positive or negative number? How can you tell? (It's not necessary to compute the value to tell – why not?)

Answer:

- B. (10) Where does $A(x)$ have critical points? Is each of them a local maximum, an local minimum, or neither?

Critical points at $x =$

local max/min/neither

- C. (10) If $B(x) = A(\tan(x)) = \int_0^{\tan(x)} t(5-t) dt$, find $B'(x)$.

$B'(x) =$

III.

A. (10) Integrate with a suitable u -substitution: $\int (6x^5 + 1)^{2/5} x^4 dx$.

Integral =

B. (10) Integrate by parts: $\int x^2 \cos(4x) dx$

Integral =

C. (10) Integrate: $\int \sec^5(x) dx$

Integral =

IV. (20) Integrate $\int_{-6}^6 x^2 \sqrt{36 - x^2} dx$

Integral =