

Name: _____

Student ID(see bubble sheet): _____

Section: _____

Instructor: _____

Math 113 (Calculus II)

Exam 1 Part B

Feb. 5,6. Feb. 7 Late Day

TWO PART

Instructions:

- For questions which require a written answer, show all your work. Full credit will be given only if the necessary work is shown justifying your answer.
- Simplify your answers.
- Calculators are not allowed.
- Should you have need for more space than is allocated to answer a question, use the back of the page the problem is on and indicate this fact.
- Please do not talk about the test with other students until after the last day to take the exam.

#	Possible	Earned
MC	36	
10	12	
11	10	
12a	6	
12b	6	
13	10	
14	10	
15	10	
Total	100	

Part B: Short Answer. Evaluate or give the best response in the blank provided. Work will not be graded in this section. Only the answer will be graded. Questions are worth 2 points a piece.

10. (12 points)

a) $\int \sec x \, dx =$

b) What is the area between the curve $y = \sqrt{1 - x^2}$ and the x -axis?

c) What substitution is required to integrate $\int \sqrt{x^2 - 1} \, dx$?

d) $\int \cos^4 x \sin x \, dx =$

e) $\int \ln x \, dx =$

f) If a force given by $F(x)$ moves an object from $x = a$ to $x = b$, give the formula that calculates the work.

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Part C: Show all work in the space provided.

11. (10 points)

A fast food beverage cup is shaped as shown in the diagram. The top of the cup is a circle of radius 4 cm and the bottom of the cup is a circle of radius 2 cm. The height of the cup is 20 cm, and a straw extends an additional 4 cm above the rim of the cup. If the cup is filled completely with soda, set up (but do NOT solve) an integral that would give the amount of work in joules required to drink the soda through the straw. (Assume the soda has the same density as water, $1000 \frac{\text{kg}}{\text{m}^3}$).

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12. Let $f(x) = 3x^2 + 2x$.

(a) (6 points) Find the value of $b > 0$ such that the average value of $f(x)$ over the interval $[0, b]$ is 2.

(b) (6 points) What values of c satisfy $f(c) = 2$ on the interval $[0, b]$ from part a?

13. (10 points) Rotate the region in the first quadrant bounded by $y = \cos(x^2)$, $y = 0$ and $x = 0$ about the y -axis and calculate the volume.

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In problems 14 through 15, find the definite or indefinite integral. Show all work. State your answer as simply as possible.

14. (10 points) $\int e^{2x} \cos(3x) dx$

15. (10 points) $\int \frac{x^2}{\sqrt{1-x^2}} dx$

END OF PART B