

Calculus II Test #2

There are a total number of 110 points available (100 are needed for a grade of 100%). Show your work and clearly label your answers. *No scrap paper, calculators, or notes are allowed.*

To get credit on a problem, you *must* give a *clear, well-written* explanation. An answer alone will not suffice.

You have 90 minutes to complete this test.

READ, AND PRINT AND SIGN YOUR NAME BEFORE BEGINNING THE TEST.

I will neither give nor receive unauthorized assistance on this test.

Printed Name _____ Signature _____

Problem 1 (10+5 pts)

(a) $\int x^2 \cos(5x) dx =$

(b) $\int_0^\pi x^2 \cos(5x) dx =$

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Problem 2 (10 pts)

$$\int \frac{2}{\sqrt{81 - 4x^2}} dx =$$

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Problem 3 (10 pts)

$$\int \sin(2x)^6 \cos(2x)^3 dx =$$

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Problem 4 (10 pts)

$$\int \frac{x}{84x^2 - 1} dx =$$

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Problem 5 (10+5 pts)

Use Simpson's Rule, with $n = 6$, to approximate $\int_0^2 (x^2 + 4)dx$, and compare to the exact answer of the integral.

Hint:
$$\int_a^b f(x)dx \approx \frac{b-a}{3n} [f(x_0) + 4f(x_1) + 2f(x_2) + 4f(x_3) + \cdots + 4f(x_{n-1}) + f(x_n)].$$

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Problem 6 (10+10 pts)

(a) $\lim_{x \rightarrow 3} \frac{e^{3-x}}{(x+3)^2} =$

(b) $\lim_{x \rightarrow \pi} \frac{\sin(6x)}{\sin(3x)} =$

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Problem 7 (10+10 pts)

- (a) Find the area of the region bounded by $y = 5$ and $y = 5 - x^2e^{-x}$.
- (b) Compute the volume of the solid formed by revolving the curve $y = e^{-x}$, starting at $x = 1$ and going right (limit as $x \rightarrow \infty$) around the x -axis.

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Problem 8 (10 pts)

Compute the area of the region bounded by the three curves

$$y = \sqrt{4 - x^2}, \quad y = \sqrt{1 - (x - 1)^2}, \quad \text{and} \quad y = -\sqrt{1 - (x + 1)^2}.$$

(Hint: Think geometrically.)