

# MATH 1312 FALL 2010

## CALCULUS II

### FIRST MIDTERM EXAM

WEDNESDAY, SEPTEMBER 22

YOUR NAME (PLEASE PRINT):

**Instructions:** This is a closed book, closed notes exam. **Use of calculators or other electronic devices such as cell phones, mp3 players, etc. is not permitted.** Unless indicated otherwise, you must justify all of your answers to receive credit. Unjustified answers and/or disorganized or otherwise illegible work will receive partial credit at best. Notation is important, and points will be deducted for incorrect use. Please do all of your work on the paper provided.

**The Honor Code requires that you neither give nor receive any aid on this exam.**

Please indicate that you have read and understood these guidelines by signing your name in the space provided:

Pledged: \_\_\_\_\_

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Do not write below this line

Problem	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Points	10	15	15	15	15	15	15
Score							

**Total:** \_\_\_\_\_

1. Match each rational function (a - e) with its partial fraction decomposition (i - v). You do not need to justify your answers.

\_\_\_\_\_ (a)  $\frac{5x^2 - 2x - 3}{x^2(x - 3)(x + 1)}$

\_\_\_\_\_ (b)  $\frac{2x^4 - 17x^3 - 10x^2 - 13x - 6}{x^2(x - 3)(x + 1)^2}$

\_\_\_\_\_ (c)  $\frac{2x^6 - 10x^5 + 45x^4 - 96x^3 + 179x^2 - 140x + 180}{x(x - 3)^2(x^2 + 2)^2}$

\_\_\_\_\_ (d)  $\frac{x^6 - 9x^5 + 46x^4 - 56x^3 - 8x^2 - 6x - 72}{x^3(x - 3)^2(x^2 + 2)}$

\_\_\_\_\_ (e)  $\frac{2x^4 - 9x^3 - 2x^2 - 9x - 6}{x(x - 3)(x + 1)(x^2 + 2)}$

(i)  $\frac{1}{x} - \frac{1}{x - 3} + \frac{1}{x + 1} + \frac{x - 1}{x^2 + 2}$

(ii)  $\frac{x}{(x^2 + 2)^2} - \frac{3x + 2}{x^2 + 2} + \frac{4}{(x - 3)^2} + \frac{5}{x}$

(iii)  $\frac{1}{x - 3} + \frac{2}{(x - 3)^2} - \frac{3}{x^2} - \frac{4}{x^3} - \frac{5}{x^2 + 2}$

(iv)  $\frac{1}{x} + \frac{2}{x^2} - \frac{3}{x - 3} + \frac{4x}{(x + 1)^2}$

(v)  $\frac{1}{x^2} + \frac{1}{x - 3} - \frac{1}{x + 1}$

**Problems 2 - 6:** Evaluate the indicated integral.

2.  $\int_0^{\pi} x^2 \sin x \, dx$

3.  $\int_0^1 \frac{x^3 - 4x - 10}{x^2 - x - 6} \, dx$

4.  $\int \ln(x^2 + 1) dx$

5.  $\int_1^2 \frac{dx}{x^4 \sqrt{x^2 - 1}}$

6.  $\int \frac{x}{x^2 + 2x + 2} dx$

7. Find the area of the surface obtained by rotating the curve  $y = \sqrt{1 + 4x}$ ,  $1 \leq x \leq 5$ , about the  $x$ -axis.

