Math 132 **Exam 1** **Spring 2015**

Name: _____

ID Number: _____

Section Number: _____

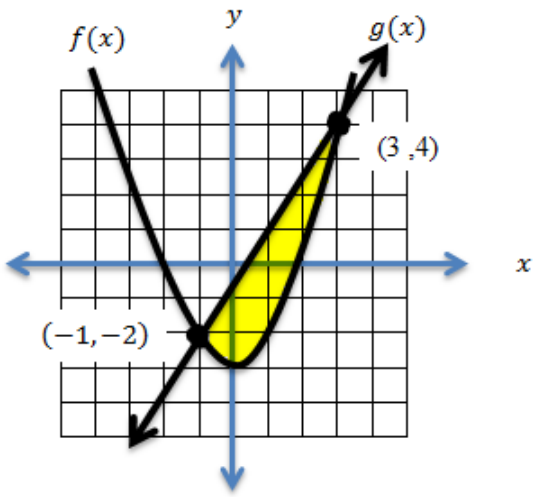
Section	Instructor	Day/Time	Section	Instructor	Day/Time
1	Farelli	MWF 10:10	9	Benincasa	TuThu 1:00
2	Farelli	MWF 9:05	10	Benincasa	TuThu 2:30
3	Clark	MWF 11:15	11	Buskin	MWF 10:10
4	Clark	MWF 12:20	12	Yaping	MWF 12:20
5	Brown	MW 2:30	13	Yaping	MWF 1:25
6	Brown	MW 4:00	15	Buckman	TuThu 11:30
7	Duanmu	TuThu 8:30	16	Wen	TuThu 1:00
8	Oloo	TuThu 10:00	17	Wen	TuThu 2:30

- No calculator, papers, or notes may be used.
- Please don't just give an answer. Clearly explain how you get it, providing appropriate mathematical details.
- This is a 2 hour exam.

Question	Grade
MC Total	
6	
7	
8	
9	
10	
Total (out of 100)	

Mutiple Choice Section: Choose the one option that best answers the question. There is no partial credit for questions 1-5.

1. [5 points] Which of the following integrals calculates the area of the shaded region?



(A) $\displaystyle\int_{-2}^{4} (g(x) - f(x))\, dx$ (C) $\displaystyle\int_{-1}^{3} (g(x) - f(x))\, dx$

(B) $\displaystyle\int_{-3}^{4} (f(y) - g(y))\, dy$ (D) $\displaystyle\int_{-3}^{4} (g(x) - f(x))\, dx$

2. [5 points] Which of the following integrals represent the volume of the solid obtained by rotating the area enclosed by $y = \frac{1}{x}$, $y = 0$, $x = 1$, $x = 3$ around the line $y = -1$.

(A) $\pi \displaystyle\int_{1}^{3} \left(\frac{1}{x^2} - 1\right) dx$ (B) $\pi \displaystyle\int_{1/3}^{1} \left(\frac{1}{y^2} + \frac{2}{y} + 1\right) dy$

(C) $\pi \displaystyle\int_{1/3}^{1} \left(\frac{1}{y^2} + \frac{2}{y}\right) dy$ (D) $\pi \displaystyle\int_{1}^{3} \left(\frac{1}{x^2} + \frac{2}{x}\right) dx$

3. [5 points] Let $h(x) = \int_5^{x^3-2x} g(t)dt$. Given the following information about $g(x)$ and $g'(x)$, find $h'(2)$.

x	0	2	4
$g(x)$	5	1	7
$g'(x)$	6	-3	10

(A) 70 (B) 7 (C) -3 (D) -21

4. [5 points] Evaluate the following derivative. $\frac{d}{dx}\int_0^{\ln(2)} e^{x^2}\,dx$.

(A) $e^{(\ln(2))^2} - e^0$ (B) $e^{(\ln(2))^2}$ (C) 0 (D) $\ln(2)$

5. [5 points] The population of a town in 1990 is 14,503 people. The rate that the population is changing, measured in people per year, is represented by $R(t)$ where t represents years after 1990. Which of the following integrals represents the total change in population from 1990 to 2007?

(A) $14,503 + \int_0^{17} R(t)\,dt$ (C) $\int_{1990}^{2007} R(t)\,dt$

(B) $14,503 + \int_{1990}^{2007} R(t)\,dt$ (D) $\int_0^{17} R(t)\,dt$

Please fill in your letter answer for questions 1-5 below:

(1) _____ (2) _____ (3) _____ (4) _____ (5) _____

Free Response Portion: Show all work for each of the following questions. Partial credit may be awarded for questions 6-10.

6. Consider the region $\mathbb{R}$ enclosed by curves $y = x^2$ and $y = \sqrt{x}$.

   (a) [5 points] Sketch the region $\mathbb{R}$. Find and label the intersection points.

   (b) [5 points] Find the area of the region in part (a).

   (c) [10 points] Find the volume of the solid obtained by rotating $\mathbb{R}$ around the **x** axis.

7. Evaluate the following integral.

(a) [5 points] $\int t^5(1+t^3)^{49}\,dt$

(b) [5 points] $\int \dfrac{\sin(x)+\tan(x)}{\cos^2(x)}\,dx$

8. Evaluate the following integrals.

(a) [5 points] $\displaystyle\int_1^2 x^{5/2} \ln(x)\, dx$

(b) [10 points] $\displaystyle\int \frac{1}{\sqrt{16+4x^2}}\, dx$

9. Evaluate the following integrals.

(a) [5 points] $\displaystyle\int_0^{\pi/3} \sin^2(\theta)\cos^3(\theta)\,d\theta$

(b) [5 points] $\displaystyle\int \frac{\sin(\ln(x))}{3x}\,dx$

10. Evaluate the following integrals.

(a) [10 points] $\int x^2 \cos(2x)\, dx$

(b) [10 points] $\int \frac{1+2x}{1+x^2}\, dx$

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