Math 132 **Exam 1** **Spring 2016**

Name: _____

ID Number: _____

Section Number: _____

Section	Instructor	Day/Time	Section	Instructor	Day/Time
1	Zhao	MWF 10:10	9	Sunukjian	TuThu 11:30
2	Zhao	MWF 9:05	10	Benincasa	TuThu 4:00
3	Nikolaou	MWF 11:15	11	Farelli	MWF 11:15
4	Nikolaou	MWF 12:20	12	Bates	MWF 12:20
5	Wen	MW 2:30	13	Hart	MWF 1:25
6	Wen	MW 4:00	15	Le	TuThu 11:30
7	Yaping	TuThu 8:30	16	Johnson	TuThu 1:00
8	Lowell	TuThu 10:00			

- No calculator, papers, phones, smart watches, 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.

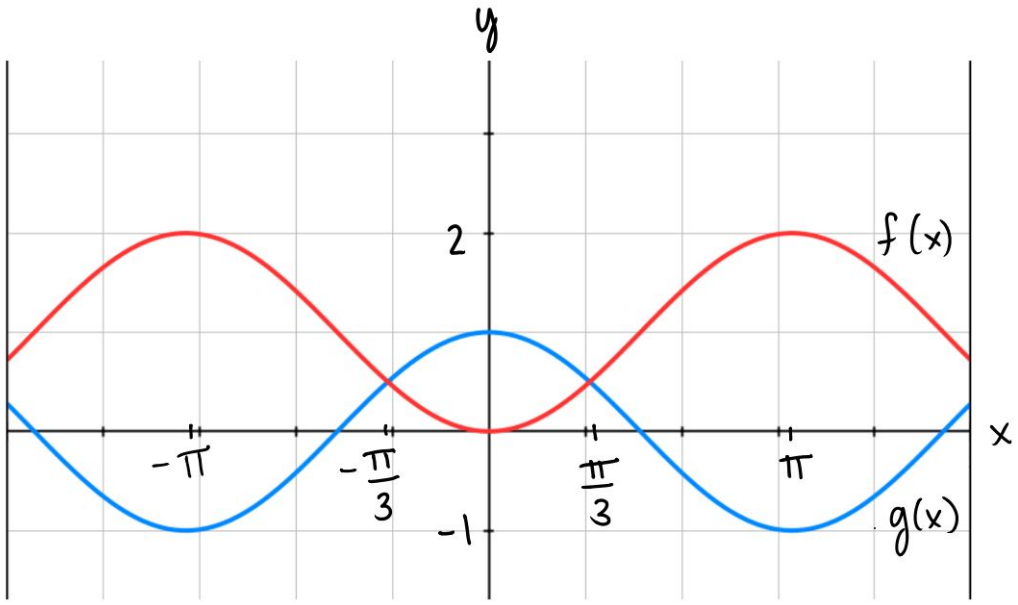
1. [5 points] Which of the following integrals can be represented with this substitution: $\int e^{u^2}\,du$?

   I. $\int e^{\tan^2(x)}\sec^2(x)\,dx$ II. $\int e^{\cos^2(x)}\,dx$

   III. $\int e^{(x-1)^2}\,dx$ IV. $2\int e^{x^2}\,dx$

   (A) III (B) I and III (C) III and IV (D) I, II, III, and IV

2. [5 points] Which of the following integrals calculates the area enclosed by the two functions in the graph below from $0 \le x \le \pi$?



   (A) $\int_{-1}^{2}(f^{-1}(y)-g^{-1}(y))\,dy$

   (B) $\int_{0}^{\pi}(f(x)-g(x))\,dx$

   (C) $\int_{0}^{\pi/3}(g(x)-f(x))\,dx+\int_{\pi/3}^{\pi}(f(x)-g(x))\,dx$

   (D) $\int_{0}^{\pi/3}(f(x)-g(x))\,dx+\int_{\pi/3}^{\pi}(g(x)-f(x))\,dx$

3. [5 points] Which of the following is equivalent to $\int \frac{\sqrt{x^2-25}}{x}\,dx$?

(A) $5\int \tan^2(\theta)\,d\theta$

(B) $25\int \sec^2(\theta)\,d\theta$

(C) $\int \sin^2(\theta)\,d\theta$

(D) $5\int \sin(\theta)\,d\theta$

4. [5 points] Find the derivative of the following function:

$$f(x) = \int_{\ln(3)}^{x^2} t \cdot g(t)\,dt$$

(A) $x^2 g(x^2) - \ln(3)g(\ln(3))$

(B) $2x^3 g(x^2)$

(C) $2x^3 g(x^2) - \frac{1}{3}\ln(3)g(\ln(3))$

(D) $\frac{x}{2}g(x^2)$

5. [5 points] Which of the following integrals would be solved using a u-substitution?

(A) $\int \sin(\theta)e^{\theta}\,d\theta$

(B) $\int \frac{3}{\sqrt{x^2-7}}\,dx$

(C) $\int \left(\frac{\sqrt{x^3}+7x^2+x}{x}\right)\,dx$

(D) $\int \sin^2(x)\cos^3(x)\,dx$

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. The velocity function of a particle moving along a line is given by $v(t) = 2t - t^2$.

   (a) [5 points] Find the total displacement of the particle during the interval $0 \leq t \leq 4$.

   (b) [10 points] Find the total distance traveled by the particle during the interval $0 \leq t \leq 4$.

7. Let $\mathcal{R}$ be the region enclosed by the curves $y = \sqrt{x}$ and $y = \frac{1}{2}x$.

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

   (b) [5 points] Find the area enclosed by the two functions.

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

8. Evaluate the integrals.

(a) [5 points] $\int 7x\cos(3x)dx$

(b) [10 points] $\int \frac{\sqrt{x^2+9}}{x^4}\,dx$

9. Evaluate the integrals.

(a) [5 points] $\displaystyle\int_1^2 \frac{e^{1/x}}{x^2} dx.$

(b) [5 points] $\displaystyle\int \tan^{-1}(x)\, dx$

10. Evaluate the integrals.

(a) [5 points] $\int \sin^5(\theta)\cos^6(\theta)d\theta$

(b) [10 points] $\int_0^{\pi/2} \cos(\theta)\sin(\sin(\theta))\mathrm{d}\theta$

This page is left blank for additional work.