Name _____ **Section** _____

Part I - Basic Skills MA 1022 Calculus Final Exam December 12, 2012

There is no partial credit on these problems – only your final answer is graded. Work carefully and check your work. You need not simplify your answers.

1. $\int (x^4 + \frac{1}{x^2} + \sqrt{x})\,dx$ Ans:_____

2. $\int x\cos(x^2)\,dx$ Ans:_____

3. $\int x\cos(x)\,dx$ Ans:_____

4. $\int \frac{1}{\sqrt{1-9x^2}}\,dx$ Ans:_____

5. $\int \frac{4}{(x+2)(x+3)}\,dx$ Ans:_____

6. $\int \frac{e^x}{1+e^x}\,dx$ Ans:_____

7. $\int_0^1 \frac{1+e^x}{e^x}\,dx$ Ans:_____

Please do not write in the boxes at the right of each answer blank

MA 1022 B 2012 Final Exam – Part II

Name _____

Instructions

This test is closed book. Calculators are not allowed. Show your work in the space provided. On this part of the exam your work and your explanations are graded, not just the final answers

Part II

Problem	**8**	**9**	**10**			**11**	**12**				**13**	**Total**
Value	16	16	4	4	8	12	6	6	6	6	16	100
	⇩	⇩				⇩					⇩	
Earned												

Please Circle your Section

B01 Berezovski, M (8:00) B02 Berezovski, M (9:00) B03 Su, L. (9:00)

B04 Malone, JJ (10:00) B05 Su, L. (10:00) B06 Abraham, J (1:00)

B07 Weekes, S (1:00) B08 Weekes, S (2:00) B09 Johnson, M (3:00)

B10 Lopez Garcia, F (2:00)

8. Find the area of the region bounded by the graphs of $y + x^2 = 6$ and $y + 2x - 3 = 0$. Include a well-labeled sketch of the region. For this question, you must evaluate your answer.

9. Let $\boldsymbol{R}$ be the region below $y = x + 3$, above $y = 1 - x$, to the right of $x = -1$, and to the left of $x = 1$. Find the volume of the solid obtained by revolving $\boldsymbol{R}$ around the x-axis. Include a well-labeled sketch of the region. <u>For this question, you must evaluate your answer</u>

10. This question has three parts – for each part, **SET UP BUT DO NOT EVALUATE** an expression for the answer

    a. Find the length of the curve $y = x^3 - 1$ from ***x=1*** to ***x=3***
    (reminder: **SET UP BUT DO NOT EVALUATE**)

    b. Find the surface area of revolution generated by rotating the curve $y = x^3 - 1$ from ***x=1*** to ***x=3*** around the x-axis
    (reminder: **SET UP BUT DO NOT EVALUATE**)

c. Find the centroid of the trapezoid whose vertices are (1,1), (3,1), (3,2), and (1,4)
(reminder: **SET UP BUT DO NOT EVALUATE**)

11. A radioactive substance has a half-life of 700 years. If there were 10 grams initially, how much would be left after 300 years? Please simplify your answer.

12. Evaluate the following integrals

a. $\int_0^{1.5} \frac{dx}{9+4x^2}$

b. $\int \frac{3x^2+7x+6}{(x+1)^3}\,dx$

c. $\int \frac{\ln x}{x\sqrt{x}}\,dx$

d. $\int_0^{\frac{\pi}{2}} \left(\sin^{\frac{3}{2}} x\right)\left(\cos^3 x\right)\,dx$

$\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$	$\sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$	$\sum_{i=1}^{n} i^3 = \left[\frac{n(n+1)}{2}\right]^2$

12. Consider the integral $\int_{2}^{5} (2x-1)\, dx$ and given the above,

(a) Write a Riemann sum $\boldsymbol{R_n}$ approximating the above integral by dividing the interval of integration into $\boldsymbol{n}$ equal parts, and evaluating the function at the right endpoints of the subintervals.

(b) Using the expression obtained in part (a), let $\boldsymbol{n} \to \infty$, and determine a numerical value for the integral. No credit will be given for simply using the Fundamental Theorem of Calculus to answer this question.

******* END OF EXAM *******