

# Final Exam

# Math 115 (A1)

Date: Monday, December 11, 2000  
Instructor: Y. Lin

2 hours

Last Name: \_\_\_\_\_ First Name: \_\_\_\_\_ Initial: \_\_\_\_\_

**MATH 115 (A1)**  
**The Final Exam**  
**Fall 2000**

Student (Print)	_____	1	
	Last                  First                  Middle	2	
Student (Sign)	_____	3	
		4	
Student ID	_____	5	
Instructor	_____	TOTAL	
Section	_____		

**Please show all your work!**

1 (a) Find the area of the region bounded by the following curves  $y = x^2 + 1$ ,  $y = 3 - x^2$ ,  $x = -2$  and  $x = 2$ .

(b) The region enclosed by the curves  $y = x$  and  $y = x^2$  is rotated by the line  $y = 2$  to generate a solid. Find the volume of the solid.

2 (a) Find  $\lim_{x \rightarrow \infty} (x^3 - 1)e^{-x^2}$

(b)  $\int x^3 e^{-x^2} dx$

$$3 \text{ (a) } \int_0^{\pi/2} \sin^2(x) \cos^2(x) dx$$

$$\text{(b) } \int \frac{dx}{(5 - 4x - x^2)^{5/2}}$$

4.(a)  $\int_0^{\infty} x e^{-x} dx$

(b) Solve the differential equation:  $\frac{dy}{dx} = 5(y + 1)(y + 3), \quad y(0) = 1$

5.(a) Find the arc length of the curve  $y = \frac{x^4}{4} + \frac{1}{8x^2}$  for  $1 \leq x \leq 3$

$$(b) \int_0^2 \frac{x^3 + x^2 - 12x + 1}{x^2 + x - 12} dx$$