



# Math 214-2 Test # 1

Winter Quarter 2003

Wednesday, January 29, 2003

Check your instructor's name and section:

Myung 8:00		Liang 12:00	
Myung 9:00		Song 12:00	
Liang 10:00		Song 1:00	
Bode 11:00			

Prob.	Possible points	Score
Part I		
1-3	8	
4-6	12	
7-9	12	
10-11	8	
Part II		
1	20	
2	10	
3	12	
4	10	
5	8	

**Instructions:**

Show *all* your work on these sheets. Feel free to use the opposite side. Make sure that your final answer is clearly indicated. No calculators, books, notes, etc. are allowed. Good luck!

Prob.	Possible points	Score
Part I	40	
Part II	60	
TOTAL	100	

**Part I, Multiple Choice**

Circle the correct answers. There will be no partial credit for problems in part I.

1. (2 points) If  $\int_0^3 f(x) dx = 12$  and  $\int_0^6 f(x) dx = 42$ , find the value of  $\int_3^6 (2f(x) - 3) dx$  .
  - A) 50
  - B) 51
  - C) 56
  - D) 57
  - E) Cannot be determined
  
2. (3 points) Find the value of the integral  $\int_1^3 \frac{dx}{x^2}$  .
  - A)  $-26/3$
  - B)  $-24/3$
  - C)  $-2/3$
  - D)  $2/3$
  - E) None of the above
  
3. (3 points) Find the value of the integral  $\int_{-1}^8 \sqrt[3]{x} dx$  .
  - A)  $49/4$
  - B)  $41/4$
  - C)  $45/4$
  - D)  $15/4$
  - E) None of the above

4. (4 points) Find the value of the integral  $\int_0^{\pi} x \sin x \, dx$ .

- A)  $4\pi - 2$
- B)  $2\pi - 2$
- C)  $\pi - 2$
- D)  $\pi$
- E) None of the above

5. (4 points) Let  $f(x) = \int_0^{x^2} t^2 \, dt$ , find the value of  $f'(2)$ .

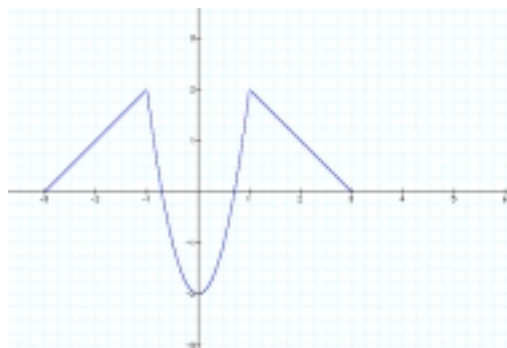
- A) 8
- B) 16
- C) 32
- D) 64
- E) None of the above

6. (4 points) The velocity  $v$  (in ft/s) of an ant crawling along a straight path at time  $t$  (in seconds) is recorded below. Use Simpson's Rule to estimate the distance the ant crawled during those 12 seconds.

t	0	2	4	6	8	10	12
v	0	2	1	1	2	1	2

- A) 8
- B) 13
- C) 14
- D) 18
- E) None of the above

7. (4 points) The graph of an even function  $f(x)$  is given below. If  $\int_{-3}^3 f(x) dx = 8/3$ , find  $\int_{-1}^0 f(x) dx$ .



- A) 0  
B)  $2/3$   
C)  $4/3$   
D)  $-2/3$   
E)  $-4/3$   
F) None of the above
8. (4 points) Find the value of the integral  $\int_0^1 \frac{x^2}{(x^3 + 1)^2} dx$ .
- A) 2  
B)  $3/4$   
C)  $3/7$   
D)  $1/6$   
E) None of the above
9. (4 points) Find the value of the integral  $\int_0^{\pi/2} \sin^2 t \cos t dt$ .
- A)  $\frac{1}{2}$   
B)  $\frac{1}{3}$   
C)  $\frac{\pi}{4}$   
D)  $\frac{2\pi}{3}$   
E) None of the above

10. (4 points) Find the value of the integral  $\int_e^{e^2} \frac{\ln t}{t} dt$ .

A)  $\ln 2$

B)  $\frac{1}{2} \ln 2$

C)  $\frac{1}{2}$

D)  $\frac{3}{2}$

E) None of the above

11. (4 points) Find the value of the integral  $\int_0^1 x e^{-x^2} dx$

A)  $-e/2$

B)  $e/2$

C)  $e^{-1}/2$

D)  $\frac{1-e^{-1}}{2}$

E) None of the above

**Part II**

1. (20 points) Evaluate the following integrals.

(a) (8 points)  $\int \sqrt[3]{x} \ln x \, dx$

(b) (12 points)  $\int e^{2t} \sin 2t \, dt$

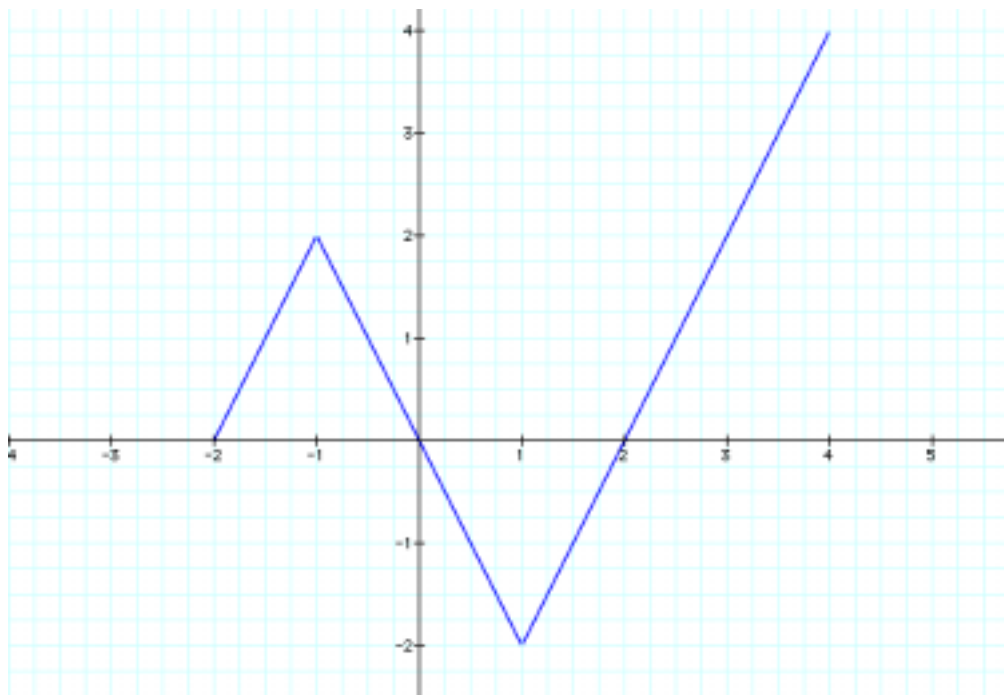
2. (10 points) Use the method of partial fractions to evaluate the integral:

$$\int \frac{5x - 7}{x^2 - 3x + 2} dx$$

3. (12 points) Evaluate the integral using trigonometric substitutions.

$$\int \frac{x^3 dx}{\sqrt{9 - x^2}}$$

4. (10 points) Let  $g(x) = \int_{-2}^x f(t) dt$ ,  $x \geq -2$ , where  $f$  is the function whose graph is shown below:



- (a) Evaluate  $g(-2)$ ,  $g(2)$ ,  $g(0)$  and  $g(3)$ .
- (b) On what interval(s) is  $g$  increasing?
- (c) What are the maximum and minimum values of  $g$  over  $[-2, 3]$ ?

5. (8 points) An animal population is increasing at a rate of  $20 + 6t$  per year (where  $t$  is measured in years). By how much does the animal population increase between the fifth and tenth year?