Stony Brook

STATE UNIVERSITY OF NEW YORK

MAT 126 Midterm 1 – Spring 2015

Problem	1	2	3	4	5	6	7	8	9	10	Total
Score	/10	/10	/10	/10	/10	/10	/10	/10	/10	/10	/100

Last Name: _____ First Name:_____

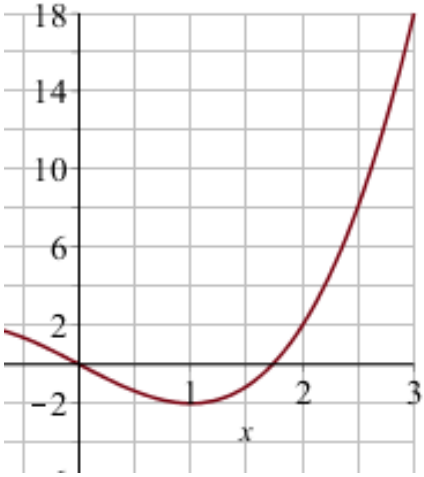
Recitation #: _____ (See below for your recitation number)

Directions: Answer all questions in the space provided. You may use the blank backs of pages for scrap. No other paper is permitted. Show ALL relevant work. Calculators are not to be used. Circle your final answers. Each numbered question is worth 10 points.

R01	F	1:00pm- 1:53pm	Library	W4535	Apratim Chakraborty
R02	Tu	4:00pm- 4:53pm	Lgt Engr Lab	152	Edward Bryden
R03	Tu	1:00pm- 1:53pm	Library	W4530	Jorge Contreras-Reyes
R04	Th	8:30am- 9:23am	Library	W4530	Debra Wertz
R05	M	1:00pm- 1:53pm	Library	E4310	Xuntao Hu
R06	M	9:00am- 9:53am	Mathematics	P131	Marlon De Oliveira Gomes
R07	W	11:00am-11:53am	Library	N4006	Selin Taskent
R08	Tu	4:00pm- 4:53pm	Earth&Space	183	Mariangela Ferraro
R09	Tu	1:00pm- 1:53pm	Library	W4535	Jingchen Niu
R10	Th	1:00pm- 1:53pm	Library	W4535	Jingchen Niu
R11	F	1:00pm- 1:53pm	Library	E4330	Marlon De Oliveira Gomes
R12	W	12:00pm-12:53pm	Lgt Engr Lab	154	Selin Taskent
R13	M	10:00am-10:53am	Library	E4320	Zheng Zhang
R14	M	12:00pm-12:53pm	Lgt Engr Lab	152	Zheng Zhang
R15	W	9:00am- 9:53am	Mathematics	P131	Edward Bryden
R16	Tu	10:00am-10:53am	Earth&Space	181	Mu Zhao
R17	W	10:00am-10:53am	Library	N3063	Mu Zhao
R18	Th	4:00pm- 4:53pm	Physics	P117	Xuntao Hu
R31	W	5:30pm- 6:23pm	Library	W4535	Dyi-Shing Ou
R32	M	5:30pm- 6:23pm	Earth&Space	183	Dyi-Shing Ou
R33	Tu	1:00pm- 1:53pm	Earth&Space	181	Gustavo Poscidonio

Directions: Show all work in the space provided. If you need more space use the blank backs of the exam sheets. Be sure that you don't have answers to any question in more than one place. Answers without the required work will receive no credit. Simplify your answers.

1. For the function, g(x), whose graph appears below:

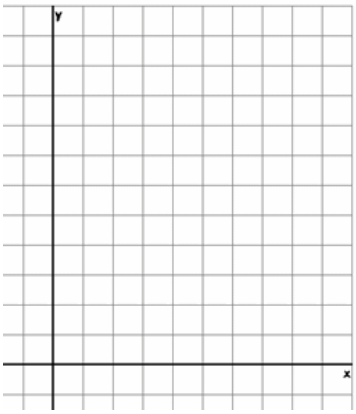


a) Estimate $\int_0^3 g(x)dx$ using a Riemann sum of 6 subintervals. Take the sample point to be the **right** endpoints in each interval. Draw the approximating rectangles and round approximate results correct to the *nearest integer*. [5]

b) The equation of the function above is $g(x) = x^3 - 3x$. Now find the exact value of $\int_0^3 g(x)dx$ by evaluating the integral *algebraically*. Remember the answer to a) is an approximation and the answer to b) is exact. [5]

2. For the function f(x) = $x^2 + 2$

a) Sketch the graph from x = 0 to x = 2 on the grid provided. Pick an appropriate scale. [4]



b) Estimate the area under the graph of f from x = 0 to x = 2 using four rectangles where the height of each rectangle is the value of f at the **left-hand** side of its base. [5]

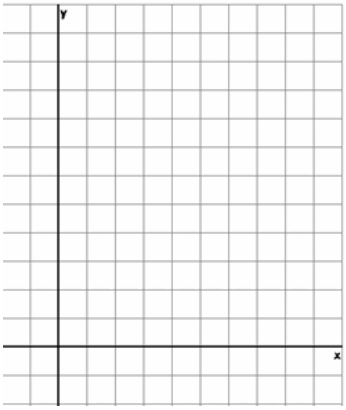
c) Is the result found in part b) an overestimate or underestimate? Carefully explain your reason. [1]

3. If $\int_1^3 g(x)dx$ = 5, $\int_1^0 g(x)dx$ = - 2 and $\int_2^3 g(x)dx$ = 2 find $\int_0^2 (g(x)dx$.

4. Calculate $\int_1^9 \frac{\sqrt{x}+1}{\sqrt{x}}$ dx.

5. Calculate $\int_{\pi/6}^{\pi/4} \cos x \ dx$.

6. For the function $h(x) = \begin{cases} \text{x for x} \leq 2 \\ 2 \text{ for x} > 2 \end{cases}$



a) Sketch the graph from x= 0 to 5 on the axes provided. Pick an appropriate scale. [2]

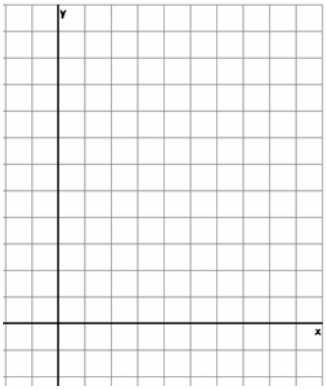
b) Without using antiderivatives, find $\int_0^5 h(x)\, dx$. In other words use the geometric properties of the graph to evaluate the integral. [4]

c) Calculate $\int_0^5 h(x)dx$ algebraically. Your answers to b) and c) should be equal. If they're not look for the error. [4]

7. Find $\int x^3(x-4)\,dx$.

8. The velocity function of a particle moving along a line (in m/s^2) is given by $v(t) = t^2 - 6t + 8$ on $0 \le x \le 4$.

a) Sketch the graph of the function on the given grid. [3]



b) Find the *displacement* over the given interval. [4]

c) Set up an integral to find the *distance traveled* over the given interval but <u>do not</u> evaluate it. [3]

9. Calculate $\int_1^{e^3} \frac{2}{x}\, dx$.

10. Find $\frac{d}{dx} \int_3^{e^{2x}} \sec(t) dt$.