Math 156 Applied Honors Calculus II Fall 2011

hw1 , due: Tuesday, September 13

The homework should be neat and legible. Please staple the sheets together.

appendix E (sigma notation) page A38 / 16 , 17 , 18 , 19 , 20

section 5.1 (area) page 325 / 20 (Note: in this problem the region R in the xy-plane has the form $R = \{(x, y) : a \leq x \leq b, 0 \leq y \leq f(x)\}$; the problem asks you to "determine the region", so you need to find the limits a, b and the function $f(x)$.)

1. True or False? Give a reason to justify your answer.

a) $(f(x)g(x))' = f'(x)g'(x)$

b) $\sum_{i=0}^{n}(n - i) = \sum_{i=0}^{n} i$

2. Evaluate the telescoping sum.

a) $\sum_{i=1}^{5}((i + 1)^3 - i^3)$

b) $\sum_{i=1}^{n}((i + 1)^3 - i^3)$

3. Prove:

a) $\sum_{i=1}^{n}(a_i + b_i) = \sum_{i=1}^{n} a_i + \sum_{i=1}^{n} b_i$

b) $\sum_{i=1}^{n} i^2 = \frac{n(n + 1)(2n + 1)}{6}$ (Hint: start from $(i + 1)^3 - i^3 = \ldots$)

4. Each set below defines a region R in the xy-plane. Draw the given region, express the area of the region as a limit of Riemann sums, and evaluate the limit.

a) $\{(x, y) : 0 \leq x \leq 1,\ 0 \leq y \leq 1 + x\}$

b) $\{(x, y) : -1 \leq x \leq 1,\ 0 \leq y \leq 1 - x^2\}$

c) $\{(x, y) : 0 \leq x \leq 1,\ 0 \leq y \leq e^x\}$

(Note: if you can't evaluate the limit in part (c), skip it - it requires the formula for the sum of a finite geometric series; we'll learn that in hw2.)