

Math, 249, Labs 5, Week of April 4, 2005

1 Section 5.5, no. 13

2 Text no. 4, Section 5.6

3 Text, #16 section 5.8

4 Write down a formula for  $\int_a^b f(x) dx$  using the right endpoints of the subintervals for evaluating the integral.

5 Find  $\int \left( \frac{3 - 2x + x^2 + 4x^3}{x^2} \right) dx$

6 For  $f(x) = x + \frac{4}{x}$  what is the value of the absolute (= global) minimum on  $(0, \infty)$

(A) 2 (B) -4 (C) -2 (D) 4 (E) 0

Answers / Hints

1  $f'(x) = 0 \Rightarrow x = 0$ . Also,  $f'(x)$  does not exist when  $x = -3$   
(Here:  $f(x) = 1 + |9 - x^2|$ ) we have  $f(-5) = 17$ ,  $f(-3) = 1$ ,  $f(0) = 10$ ,  
 $f(3) = 9$ . Max. is 17 at  $x = -5$ , Min. is 1 at  $x = -3$

2  $A = xy$ ,  $x + 2y = 1000$  so  $A = 500x - \frac{x^2}{2}$  for  $x$  in  $[0, 1000]$   
 $A$  is a max when  $x = 500$ ,  $y = 250$

3  $f(2) = 1$ ,  $f(5) = \frac{1}{4}$ ,  $f'(x) = -\frac{1}{(x-1)^2}$ ,  $c = -1$  (reject) or  
 $c = 3$   $\frac{4}{n} \left[ f\left(\frac{1}{n}\right) + f\left(\frac{2}{n}\right) + \dots + f\left(\frac{n}{n}\right) \right]$

5  $-\frac{3}{x} - 2 \ln|x| + x + 4 \frac{x^2}{2} + C$  6 (A)