

M215 Homework Assignment 8

Please do the following homework problems but do **not** hand them in:

(4.3) 1, 3, 5, 7, 9, 11, 15, 29, 31, 49

(4.4) 1, 3, 9, 11, 13, 15, 17, 19, 23, 25, 43, 45

(4.7) 1, 3, 4 [answer = 1], 5, 11, 13, 17, 25, 31, 33, 47

Please **hand in** the following problems on Wednesday, October 21:

Section 4.3.

1. Let  $f(x) = \frac{x}{x^2 + 4}$ .

(a) Find the intervals on which  $f$  is increasing or decreasing.

(b) Find the local maximum and local minimum values.

2. Let  $f(x) = x^4 - 96x^2$ . Find the intervals of concavity and the inflection points.

Section 4.4.

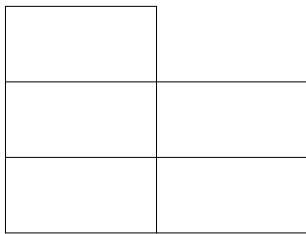
3. Find each limit:

(a)  $\lim_{x \rightarrow \infty} \frac{x}{\sqrt{x^2 + 4}}$

(b)  $\lim_{x \rightarrow -\infty} \frac{x}{\sqrt{x^2 + 4}}$

Section 4.7.

4. Five identical rectangular pens are going to be constructed as shown. What dimensions for each pen should be chosen so that the five pens hold the maximum possible area, if there are 560 feet of fence available?



5. A straight river flows from east to west. Suppose it is 210 feet wide. A cable needs to be laid from point  $A$  on the north bank on the river, to point  $B$  on the south bank, and then to point  $C$ , which is 1000 feet to the east of point  $A$ . Where exactly should point  $B$  be located to minimize the cost of laying the cable, if it costs \$149 per foot to lay cable under the river, and \$51 per foot to lay cable along the bank? (Note, in the diagram, the distance from  $A$  to  $D$  is 210 feet, and the distance from  $D$  to  $C$  is 1000 feet.)

