

**In-Class Exam 2**  
STUDY GUIDE  
Wednesday, April 15, 2013

**TOPICS:** Chapter 4 and Sec 5.1, 5.2, 5.4 and 5.5.

Review all your paper and WebAssign homework and do the following problems.

I. Complete a) to i) for each of the following functions:

1.  $y = f(x) = \frac{x + 2}{x - 2}$

2.  $y = f(x) = \frac{1}{3}x^3 + \frac{1}{2}x^2 - 6x + 1$

3.  $y = f(x) = \frac{e^x - 1}{e^x + 1}$

Justify your work! No credit for answers without showing work.

a) Determine the domain of f.

Domain:

b) Find the  $x$ - and  $y$ - intercepts of f (you can give approximate values)

$x$ -intercepts :

$y$ -intercepts :

c) Determine the behavior of  $f$  for large absolute values of  $x$ .

$\lim_{x \rightarrow \infty} f(x) =$

$$\lim_{x \rightarrow -\infty} f(x) = \boxed{\phantom{000000}}$$

d) Find all horizontal and vertical asymptotes of the graph of  $f$  (if any).

Horizontal asymptotes :

Vertical asymptotes :

e) Determine the intervals where  $f$  is increasing and where  $f$  is decreasing.

$f$  is increasing on :

$f$  is decreasing on :

f) Find the relative extrema of  $f$ .

Local maxima :

Local minima :

g) Determine the concavity of the graph of  $f$ .

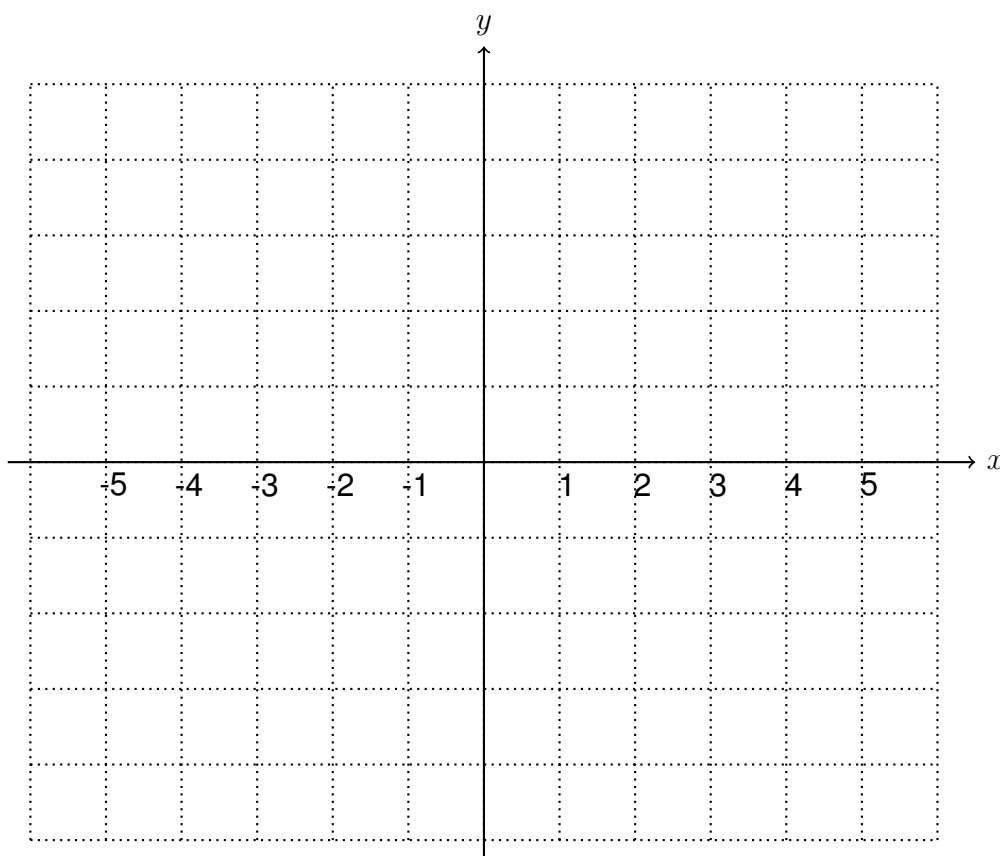
$f$  is concave up on :

$f$  is concave down on :

h) Find the inflection points of  $f$ .

Inflection points of  $f$ :

i) Sketch the graph of the function in the grid below clearly labeling all the points that you determined in b), f), and h). (Hint: Determine an appropriate scale for the  $y$ -axis.)



II. Find the absolute extrema of the following functions.

1.  $y = f(x) = \frac{x+2}{x-2}$  on  $[-1, 1]$

2.  $y = f(x) = \frac{1}{3}x^3 + \frac{1}{2}x^2 - 6x + 1$  on  $[-3, 2]$ .

3.  $y = f(x) = \frac{e^x - 1}{e^x + 1}$  on  $[-\ln(4), \ln(4)]$

III. Solve the following problems from the textbook:

- Chapter 4, page 325: 35, 49; page 327: 51, 6 (from before moving on....)
- Chapter 5, page 377: 37, 38, 39, 65