MTH 1125 (2 pm) Test #3

FALL 2022

Pat Rossi Name _____

Instructions. Show CLEARLY how you arrive at your answers.

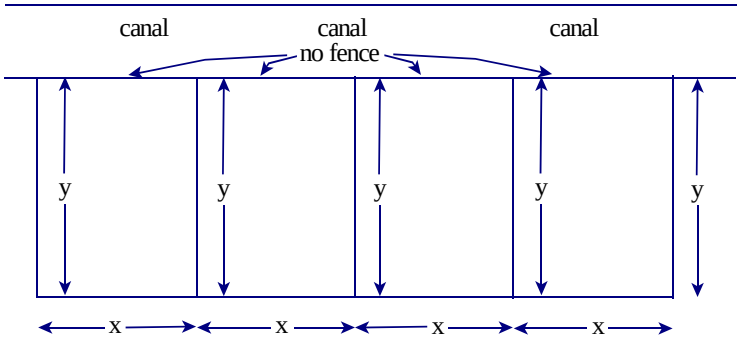
1. $f(x) = x^3+6x^2+9x+1$ Determine the intervals on which $f(x)$ is increasing/decreasing and identify all relative maximums and minimums.

2. $f(x) = \frac{1}{4}x^4 + x^3 + 2x + 4$ Determine the intervals on which $f(x)$ is Concave up/Concave down and identify all points of inflection. (Caution - there are **two** points of inflection. Make sure you get them both!)

3. $f(x) = x^3 + 6x^2 - 36x + 10$ on the interval $[-1, 3]$. Find the Absolute Maximum and Absolute Minimum values (if they exist).

4. $f(x) = \frac{1}{2}x^{\frac{12}{5}} - 12x^{\frac{2}{5}} + 1$ Determine the intervals on which $f(x)$ is increasing/decreasing and identify all relative maximums and minimums.

5. Farmer Joe has 1000 yards of fencing with which he will construct a rectangular pen. One side of the pen will border on a straight canal, and no fencing will be required on that side. In addition, Farmer Joe will use some of the fencing to partition the pen into four smaller pens of equal size and similar shape (See picture below). What should the overall dimensions of the pen be in order for the pen to contain the largest area possible?



EXTRA! (Wow! 10 points!)

In the exercise below,
[1]Deterimine the intervals on which $f(x)$ is increasing/decreasing
[2]Identify all relative maximums and minimums
[3]Deterimine the intervals on which $f(x)$ is CCU/CCD
[4]Identify all points of inflections
[5]Graph $f(x)$

$f(x) = x^3 - 3x^2 - 9x + 13$