Math 113 Exam 3

Profs. Bukiet and Plastock, 11-17-99

Show all work in order to receive partial credit. NO CALCULATORS!!!!

DO all of the following problems - 10 points each

1) Find the derivative $f'(x)$ for $f(x) = [\ln(x^2 + 3)]^4$

2) Find all horizontal and vertical asymptotes for $f(x) = \dfrac{12x^2}{x^2 - 7x + 10}$

3) Find the absolute maximum and minimum of $f(x) = 3x^{1/2} - x^{3/2}$ on the interval [0,4].

4) A rectangular pen with one side being existing brick wall is to contain an area of 200 m^2. Find the dimensions that minimize the length of fencing needed.

5) A rectangular pen with one side being existing brick wall is to contain an area of 200 m^2. The side parallel to the brick wall costs 4 dollars per foot and the sides perpendicular to the brick wall cost one dollar per foot. Find the dimensions that minimize the cost of the fencing needed.

6) If $x^3 - y^4 = 11$ and $\frac{dx}{dt} = 2$ when $x = 3$ and $y = 2$, find $\frac{dy}{dt}$ at this time.

7) Evaluate $\int [\ 2x - \sqrt{x} + e^{2x} - \dfrac{1}{3x}\ ]dx$

DO OF THE FOLLOWING 30 POINT PROBLEM

9) Graph $f(x) = x^4 - 8x^3$. Find and label all maxima, minima and inflection points. On what intervals is $f(x)$ increasing and decreasing? On what intervals is $f(x)$ concave up and concave down?