Exam 2 Nov. 8, 2006 SHOW ALL WORK
Math 25 Calculus I Either circle your answers or place on answer line.

[12] 1.) If $f'(x) = 3x + 8x^{-1} + 2e^x - x^{\frac{5}{2}} - 3$, find f.

Answer 1.) _____

[15] 2.) Given $ln(x + y) = 4sin(x)$, find y''. You do NOT need to simplify your answer and you can leave your answer in terms of x and y (and only in terms of x and y, y' should not appear in your final answer).

Answer 2.) _____

[15] 3.) Given $y = x^x$, find y'. Simplify your answer.

Answer 3.) _____

[15] 4.)$lim_{x \to 0^+}[x^x] =$ _____

[15] 5.) Find the area of the largest rectangle that can be inscribed in the ellipse, $x^2+\frac{y^2}{4}=1$.

How do you know that your answer is the largest possible area?

Answer 5.) _____

[10] 6a.) If $y = x^{\frac{4}{3}}$, find the differential dy and evaluate dy when $x = 8$ and $dx = 0.1$

6b) Find the linearization of $f(x) = x^{\frac{4}{3}}$ at $x = 8$.

6c.) Use the linearization (or differential) to estimate $(8.1)^{\frac{4}{3}}$

7.) Find the following for $f(x) = \frac{4}{3}x^{\frac{3}{2}} - \frac{x^2}{2} = x^{\frac{3}{2}}(\frac{8-3x^{\frac{1}{2}}}{6})$ (if they exist; if they don't exist, state so). Use this information to graph f.

Note $f'(x) = 2x^{\frac{1}{2}} - x = x^{\frac{1}{2}}(2 - x^{\frac{1}{2}})$ and $f''(x) = x^{\frac{-1}{2}} - 1 = x^{\frac{-1}{2}}(1 - x^{\frac{1}{2}})$

[1] 7a.) critical numbers: _____

[1.5] 7b.) local maximum(s) occur at $x =$ _____

[1.5] 7c.) local minimum(s) occur at $x =$ _____

[1.5] 7d.) The global maximum of f on the interval [0, 5] is _____ and occurs at $x =$ _____

[1.5] 7e.) The global minimum of f on the interval [0, 5] is _____ and occurs at $x =$ _____

[1.5] 7f.) Inflection point(s) occur at $x =$ _____

[1.5] 7g.) f increasing on the intervals _____

[1.5] 7h.) f decreasing on the intervals _____

[1.5] 7i.) f is concave up on the intervals _____

[1.5] 7j.) f is concave down on the intervals_____

[1] 7k.) Equation(s) of vertical asymptote(s)_____

[1] 7l.) Equation(s) of horizontal and/or slant asymptote(s)_____

[4.5] 7m.) Graph f