MATH 205 EXAM 2

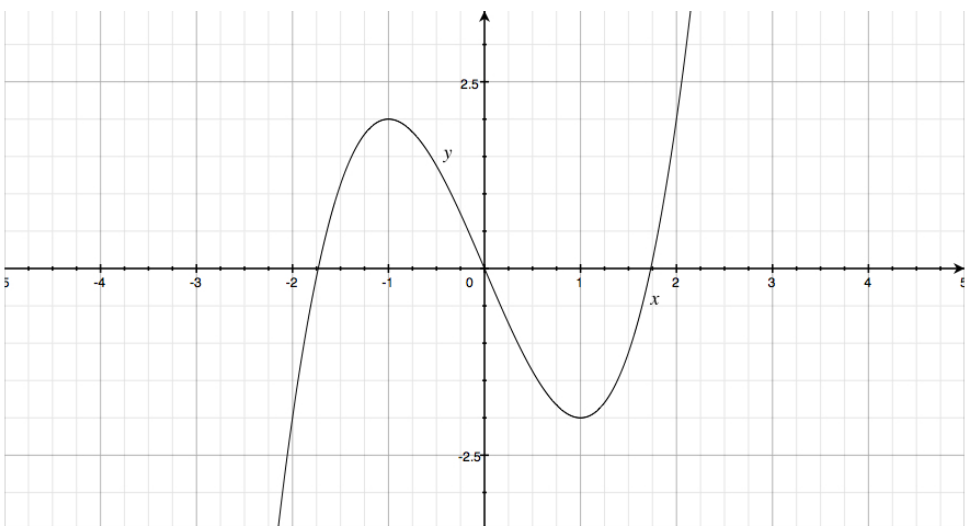
Thursday June 28, 2007

Instructor's Name:____________________ **Name:**__________________________

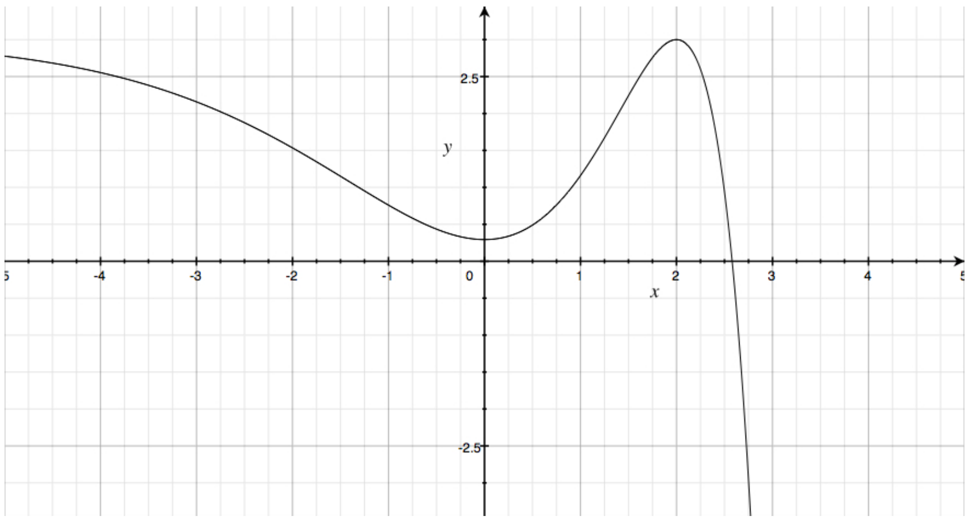
Calculators are permitted (but unnecessary). No books or formula sheets are allowed. Use the back pages as sketch paper. For full credit, show your work in detail.

Total: 100	#1	#2	#3	#4	#5	#6	#7	#8

1 (12 pts). The graph of a function $y = f(x)$ is shown. Sketch the graph of its derivative $\frac{dy}{dx} = f'(x)$ on the same coordinate axes.



2 (12 pts). Consider the function represented by the following graph.



(a) (6 pts). Estimate the intervals on which the derivative is positive and the intervals on which the derivative is negative.

(b) (6 pts). Estimate the intervals on which the second derivative is positive and the intervals on which the second derivative is negative.

3 (12 pts). Suppose that $f(x)$ is a function with $f(20) = -3$ and $f'(20) = 6$.

(a) (6 pts). Estimate $f(22)$.

(b) (6 pts). Estimate $f(17)$.

4 (12 pts). For q units of a product, a manufacturer's cost is $C(q)$ dollars and revenue is $R(q)$ dollars, with $C(500) = 7200$, $R(500) = 9400$, $MC(500) = 15$, and $MR(500) = 20$.

(a) (6 pts). What is the profit or loss at $q = 500$?

(b) (6 pts). If production is increased from 500 to 501 units, by approximately how much does profit change?

5. (13pts). Find the derivative.

(a) (4 pts). $y = x^{\frac{4}{3}}$.

(b) (4 pts). $y = 8x^3$

(c) (5 pts). $y = \frac{1}{x^5}$

6. (13pts). Find the derivative.

(a) (4 pts). $y = 3e^x$

(b) (4 pts). $y = 10 - \ln x$

(c) (5 pts). $y = 2^x + 2 \cdot 3^x$.

7. (13pts). Find the derivative.

(a) (4 pts). $y = e^{-4x}$

(b) (4 pts). $y = \ln(4x + 9)$

(c) (5 pts). $y = (x^3 + 1)^{100}$

8. (13pts). Find the derivative.

(a) (4 pts). $y = x^2 \ln x$.

(b) (4 pts). $y = \frac{1-x}{1+x}$

(c) (5 pts). $y = (5x^2 + 3)e^{x^2}$