

MATH 157-D200 Instructor: R. Pyke

Midterm 2, July 3, 2008 *Version 2*

Last Name:	
First Name:	
SFU Student email :	@sfu.ca

1. DO NOT LIFT UP THE COVER PAGE UNTIL INSTRUCTED.
2. Clearly explain your answer. No credit will be given for just writing down the answer.
3. If the answer space provided is not sufficient, write your answer on the back of the previous page.
4. Ordinary Scientific Calculators ONLY are allowed.
NO GRAPHING CALCULATORS ALLOWED.
5. **Copying someone else's test, or deliberately exposing written papers to the view of others is forbidden and will result in a score of zero and disciplinary action.**

Question	Score	Max
1		4
2		4
3		6
4		4
5		4
6		4
7		4
Total		30

(1) [Marks: 4] Consider the curve $x^2 + xy + y^2 = 3$.

(a) Which of the points $(2, -1)$ and $(1, 1)$ is on the curve. Explain your reasoning.

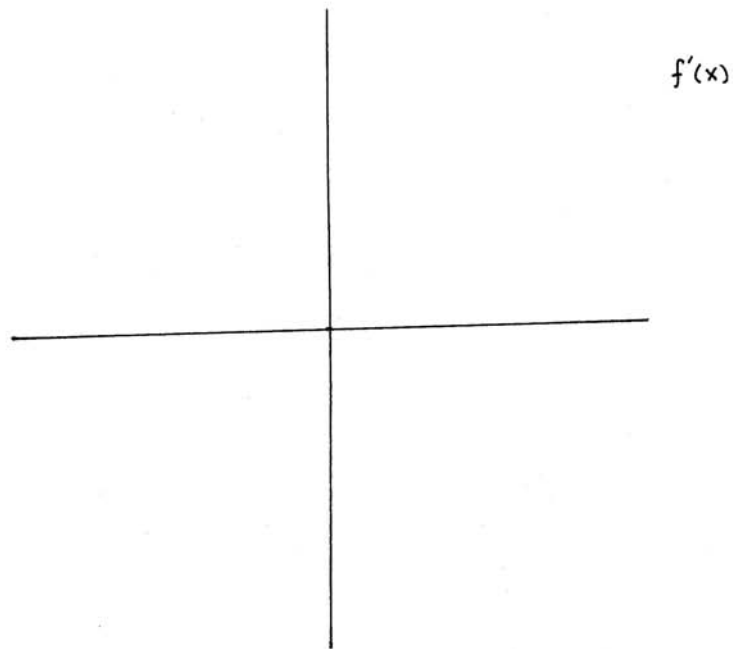
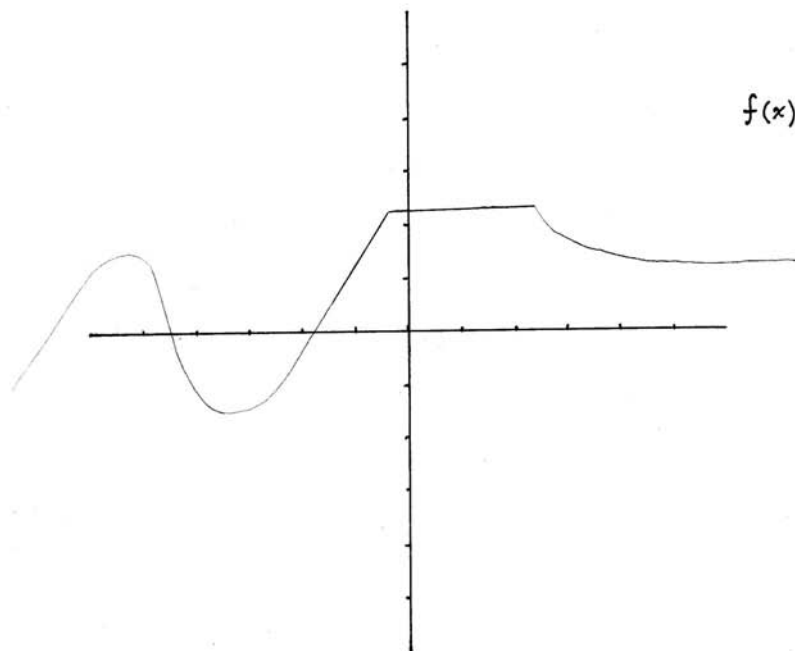
(b) Find the equation of the tangent line to the curve at that point. (If you didn't answer part (a) just use either of the points for this part.)

(2) [Marks: 4] Find the indicated derivative. Do not simplify.

(a) $f(x) = 2 - xe^{4x-1}, \quad f'(x)$

(b) $y = \log_2 \left(\frac{2}{x^2} \right) - 3x, \quad y''(x)$

- (3) [Marks: 6] Sketch the derivative function $f'(x)$ of the following function $f(x)$;



(4) [Marks: 4] Use linear approximation to estimate the value of $3^{2.2}$.

(5) [Marks:4] The population of country X was 22 million at the beginning of 1980. At the beginning of 2005 it was 35 million.

(a) Assuming the population is growing exponentially, write down a model (function) for this population. Let t be time in years with $t = 0$ corresponding to 2005.

(b) Use this model to predict when the population will reach 50 million.

- (6) [Marks: 4] The demand equation for a certain commodity is $p + 2\sqrt{x} = 100$ where p is the unit price and x is quantity demanded.

(a) Compute the elasticity of demand when $x = 1,600$ and interpret your answer.

- (7) [Marks: 4] The number q of cars manufactured per week depends on the number x of machines that are currently in operation according to the equation $2q^2 - x^2 = 220$. If the number of machines is increasing at the rate of 2 per week, at what rate is the number of cars manufactured per week changing if at that time there are 12 cars manufactured per week?