Math 118 February 22, 2006 Name:_____

MIDTERM #1

This exam is 4 pages long (counting this one); check that you have all the pages. Show your work. Correct answers with no justification may receive little or no credit. No books, notes, or calculators are allowed. No unnecessary simplification is required. Use the backs of pages if you run out of space, make sure that I can find your answers, and THINK JOYFULLY.

PROBLEM	POINTS	SCORE
1	20	
2	20	
3	20	
4	20	
5	20	
TOTAL	100	

1. For each of the following functions, compute the slope of the tangent line to the graph at the point indicated.

(a) $f(x) = 3x^2 + 2x + 7$, at $x = -1$

(b) $g(x) = \dfrac{1}{x}$, at $x = 3$

(c) $h(t) = t \cdot 5^t$, at $t = 0$

2. The following table gives the number (in millions) of Visa cards worldwide for 1996 through 2000. (Source: www.visa.com)

Year	1996	1998	2000	2002
Visa cards (millions)	510	656	1000	1200

Roughly how fast was the number of Visa cards growing in 1999? (Give units.)

3. A certain tall, out-of-work actor has decided to start his own footwear company, Shoebacca. He's trying to figure out how many people he should hire to work in his factory. Let $f(x)$ be the number of pairs of fashionable women's shoes that his company can make in one day if he has x people working for him.

(a) Explain, in words, the meaning of the following:

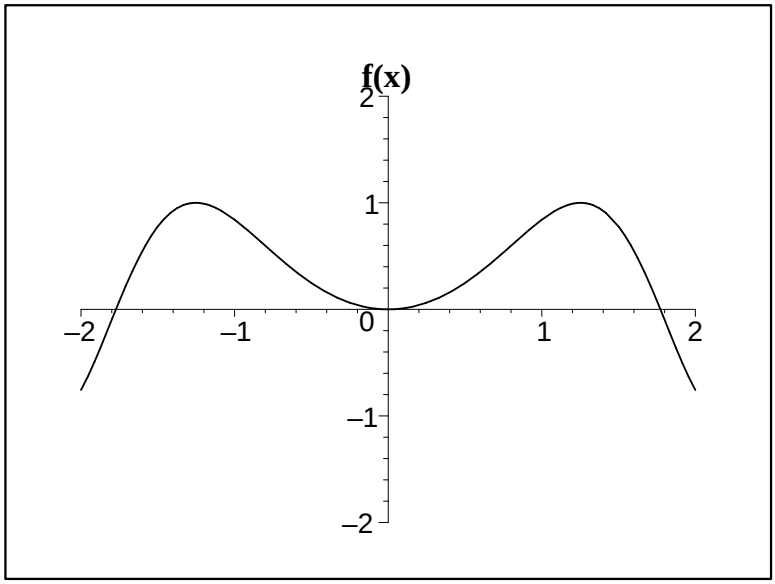
(i) $f(10) = 100$

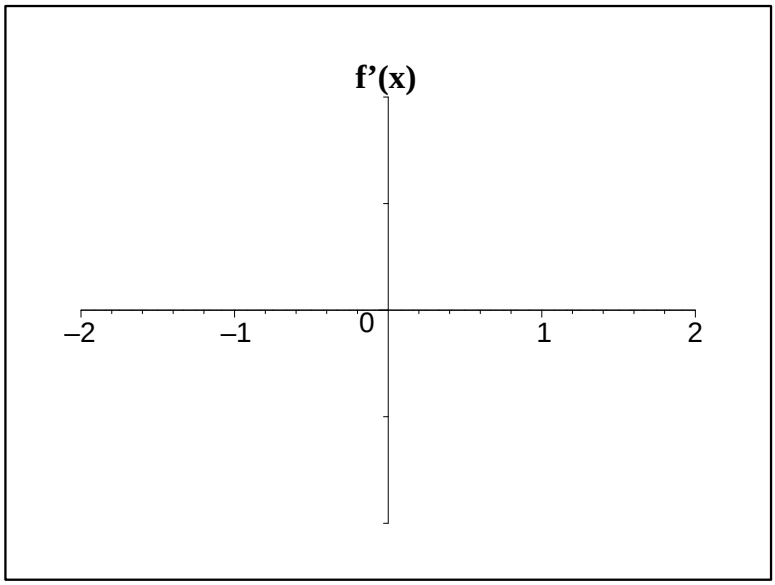
(ii) $f^{-1}(50) = 6$

(b) What is $f'(5)$ telling you? What are the units? Do you expect it to be positive or negative? Why?

(c) True or false: Shoes are more interesting than cars.

4. The function $f(x)$ is graphed below. Sketch the graph of $f'(x)$ beneath it.





5. My arch-enemy Sideshow Bob has started a monkey colony in my attic, and they're reproducing. After t months, there are $m(t) = 10e^t$ monkeys in my attic.

(a) How long does it take for the number of monkeys to triple?

(b) How fast is the number of monkeys growing after 3 months? (Give units.)

EXTRA CREDIT Sketch the tangent lion.