SAMPLE MIDTERM 2
MAT 125 Spring 2004
Midterm 2 is 8:30-10:00pm,
Tuesday 3/30/04
Exam locations given
in table on right

room	sections
Javits 100	1,2,5,8,9,11,13
Javits 102	6,7,12
Javits 103	15
Javits 109	3,10
Lib All, W0 512	4,14
Physics P-113	ELC 4

1. Find the derivtive of each function.

   (i) x^8

   (ii) $\sin(x)$

   (iii) e^x

   (iv) $\sin(x)e^x$

   (v) $e^x/(1+x)$

   (vi) $\cos(1+x^2)$

   (vii) $\sin^2(x)$

   (viii) $x^2\cos(x)e^x$

   (ix) $\sin(xe^x)$

   (x) $\sqrt{\cos(x^2)}$

2. Find each of the following limits (or say that it does not exist).

   (i) $\lim_{x\to 0} 1/|x|$.

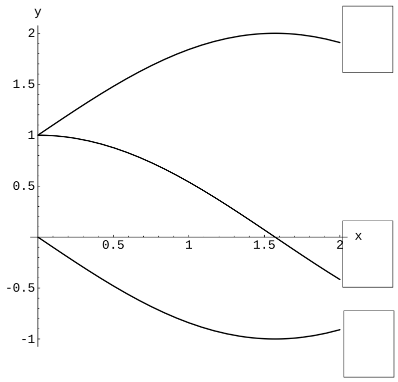
   (ii) $\lim_{x\to 0+} \log(x)$

   (iii) $\lim_{x\to 2}(x+2)/(x-2)$

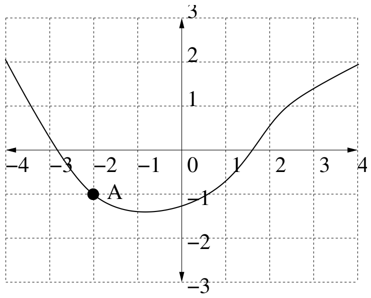
   (iv) $\lim_{x\to +\infty}(x^2+x)/(2x^2+x+1)$

   (v) $\lim_{x\to +\infty}(x^2)/(x^3+2)$.

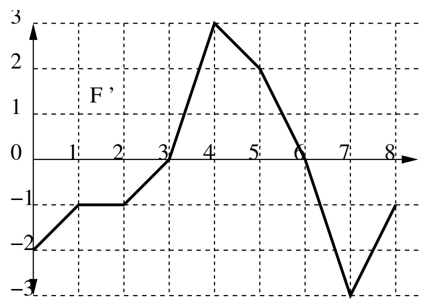
3. Inthe following figure, a function f and its first two derivatives, f' and f'', are graphed. Label each graph by putting a f, f' or f'' in the adjacent box.



4. Draw the tangent line to the graph at the marked point and estimate its slope. Use this estimate to write the formula for the tangent line.



5. The DERIVATIVE of f is graphed below. Answer the questions about f.



(i) At what interior points does f have a local maximum?

(ii) If $f(0) = 0$, what is $f(1)$?.

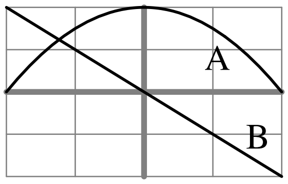
(iii) Which is larger: $f''(3.5)$ or $f''(7.5)$?

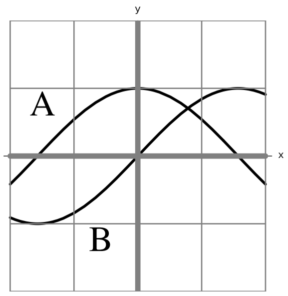
(iv) Where does f take its global maximum?

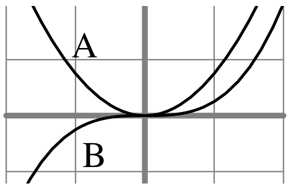
(v) What is the maximum value of $f'(x)$?

(vi) Is f concave down on the interval $0 \leq x \leq 4$?

6. Each figure shows a function and its derivative. Label the graphs to show which is f and which is f'.







7. Use the limit definition of derivative to compute the derivative of $f(x) = \sqrt{x}$.

8. Where is the function $f(x) = x^4 - 2x^3 + x + 2$ concave down?