SAMPLE MIDTERM 2
MAT 125 Spring 2005
Midterm 2 is 8:30-10:00pm,
Tuesday 3/29/05
Exam locations given
in table on right

| room	sections
Javits 100	1,7-9,11,13-15
Javits 102	5, ELC4
Physics P-113	10
Heavy Eng 201	6,12
Harriman 112	2
Harriman 116	4
Old Chem 147	3

1. Find the derivtive of each function.

   (i) x^8

   (ii) $x^{2/3}$

   (iii) $x^{\sqrt{2}}$.

   (iv) $\sin(x)$

   (v) e^x

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

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

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

   (ix) $\sin(x)\cos(x)$

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

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

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

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.


1
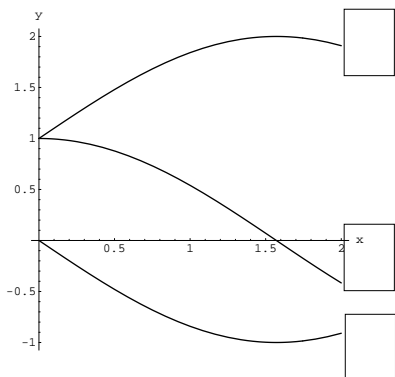
4. Draw the tangent line to the graph at the marked point and estimate its slope. Use this estimate to write the formula for the tangent line.
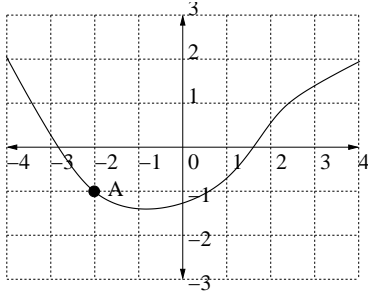

5. The DERIVATIVE of f is graphed below. Answer the questions about f.

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

   (ii) If $f(1) = 0$, what is $f(2)$?.

   (iii) Which is larger: $f''(2.5)$ or $f''(3.5)$?

   (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 $0 \le x \le 4$?
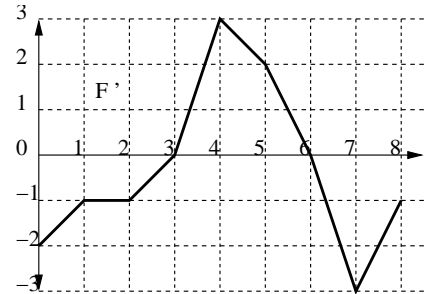
6. Each figure shows a function and its derivative. Label the graphs to show which is f and which is f'.
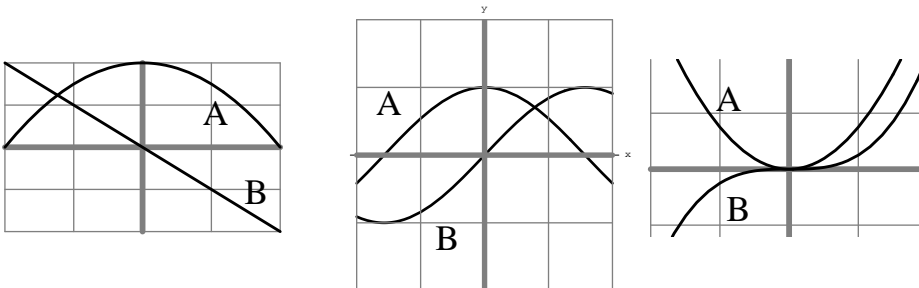
7. Use the limit definition of derivative to compute the derivative of $f(x) = \sqrt{x}$.

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