

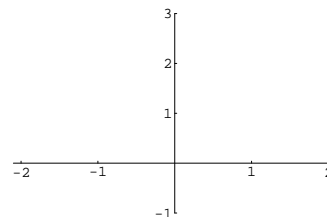
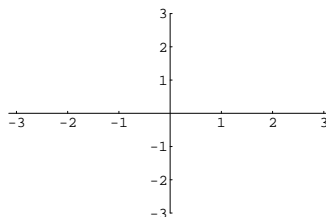
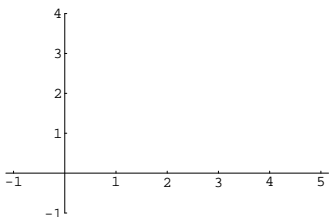
CHAPTER 4 TEST

All brains and no machines, please.

Math 231
October 22, 2008

Name: _____
By printing my name I pledge to uphold the honor code.

1. For each set of axes, sketch a graph of f with all the properties listed below it.



- $\frac{f(2)-f(1)}{1} = 2$

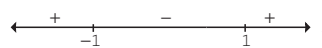
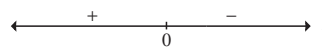
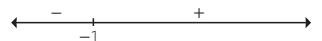
- $\frac{f(4)-f(2)}{2} = 1$

- $\lim_{h \rightarrow 0} \frac{f(2+h)-f(2)}{h} = 0$

- $\lim_{x \rightarrow 1} f(x) = 2$

- $\lim_{h \rightarrow 0^-} \frac{f(1+h)-f(1)}{h} = 2$

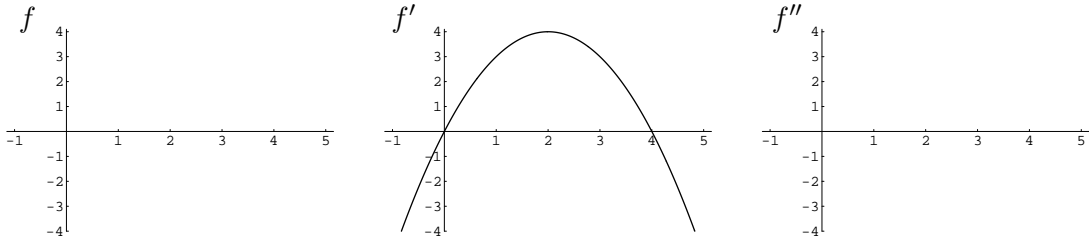
- $\lim_{h \rightarrow 0^+} \frac{f(1+h)-f(1)}{h} = 0$



2. a) What does Rolle's Theorem say about $f(x) = x^2 - 3x - 4$ on the interval $[-1, 4]$?

b) In your answer above you should have said something "exists." Use calculus to find it. (You MAY use derivative rules/shortcuts here.)

3. Given the graph of f' shown below, sketch possible graphs of f and f'' . Be sure to clearly mark any important points of your graphs (zeros, extrema, inflection points).



4. a) Use the definition of derivative to find the derivative of $f(x) = x^2 - 4$. Show your work clearly. (Do NOT use the shortcuts/rules. We know the answer will be $2x$.)

b) Now do the same calculation but using the *alternative* definition of derivative.