11am

Quiz 2

Fall 2012

Your name: ________________________________

Math 0220

Your TA’s name: ________________________________

No calculators, no notes, no books. Show all your work (no work = no credit). Write neatly. Simplify your answers.

1. (a) [4 points] The functions \( F(x) = \sec\left( (x^2 - 4)^{-1/3} \right) \) can be expressed in the form \( f \circ g \circ h \). Find \( f(x) \), \( g(x) \), and \( h(x) \).

(b) [3 points] What is the domain of \( g \circ h \)?
2. [7 points] Sketch the graph of an example of a function $g(x)$ if it has the domain $[-2, 6)$ and satisfies all the given conditions. Mark all important points on the graph and the axes.

$g(-2) = 1, \quad \lim_{x \to 0^-} g(x) = -2, \quad \lim_{x \to 0^+} g(x) = 2, \quad g(2) \text{ is undefined,}$

$g(3) = 5, \quad \lim_{x \to 3^-} g(x) = 3, \quad \lim_{x \to 3^+} g(x) = 1,$

$\lim_{x \to 5} g(x) = -2, \quad g(5) = 2, \quad \lim_{x \to 6^-} g(x) = -1.$
3. [6 points] Evaluate the difference quotient $\frac{f(2 + h) - f(2)}{h}$ for the function $f(x) = x^3$. 
bonus problem [5 points extra] How big do you think the limit

\[ \lim_{x \to 2} \frac{x^2 - 2x}{x^2 - x - 2} \]

is?