Math 180 Name _____
Fall, 2008

Homework #4
Due Monday, September 15
No late papers accepted! No excuses!

1. a) Find the slope of the tangent line to the curve $y = 9 - 2x^2$ at the point (2, 1).
   b) Find an equation of this tangent line.
   c) Graph both y and the tangent line.

2. Find the constant c that makes g continuous on $(-\infty,\infty)$.

$$g(x)=\begin{cases}x^2-c^2, x<4\\ cx+20, x\geq 4\end{cases}$$

3. Let $f(x)=\sqrt{x}$ *and* $g(x)=\sin x$. Find $f\circ g$ and determine where $f\circ g$ is continuous on the interval $[-4\pi,4\pi]$.

4. Let

$$f(x)=\begin{cases}\sqrt{-x}, x<0\\ 3-x, 0\le x<3\\ (x-3)^2, x\ge 3\end{cases}.$$

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a) $\lim_{x\to 0^-} f(x)$ b) $\lim_{x\to 0^+} f(x)$

c) $\lim_{x\to 0} f(x)$ d) $f(0)$

e) $\lim_{x\to 3^-} f(x)$ f) $\lim_{x\to 3^+} f(x)$

g) $\lim_{x\to 3} f(x)$ h) $f(3)$

i) Where is f discontinuous? Why?
ii) Sketch the graph of f.