

Math 180
Spring 2010

Name _____

Homework #4
Due Tuesday, March 16
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

$$f(x) = \begin{cases} \sqrt{-x}, & x < 0 \\ 3 - x, & 0 \leq x < 3 \\ (x - 3)^2, & x \geq 3 \end{cases}$$

a) $\lim_{x \rightarrow 0^-} f(x)$

b) $\lim_{x \rightarrow 0^+} f(x)$

c) $\lim_{x \rightarrow 0} f(x)$

d) $f(0)$

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

f) $\lim_{x \rightarrow 3^+} f(x)$

g) $\lim_{x \rightarrow 3} f(x)$

h) $f(3)$

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

5. Use the δ/ε definition of a limit to prove $\lim_{x \rightarrow -2} (3x - 4) = 10$.