1. The displacement in meters of a particle moving in s straight line is given by $s(t) = t^2 - 4t + 5$, where t is measured in seconds. a) Find the average velocity of the particle over the time interval $1 \leq t \leq 2$ and then on the interval $2 \leq t \leq 3$.   b) Estimate the instantaneous velocity of the particle when t=2 sec.

2. Find the following limits:

a) $\lim_{x \to 0} (\sin^2 x - \cos 3x)$ = _____

b) $\lim_{x \to 3} \dfrac{x - 3}{9 - x^2}$ = _____

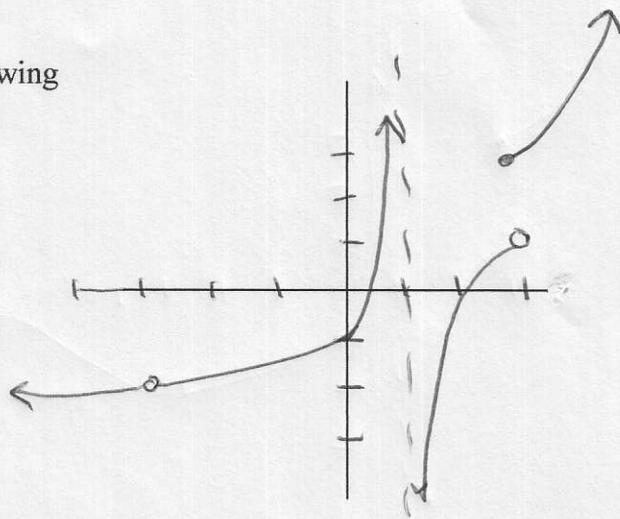c) $\lim_{x \to 1} \dfrac{1 - x}{\sqrt{x} - 1}$ = _____

d) $\lim_{h \to 0} \dfrac{(3+h)^{-1} - 3^{-1}}{h}$ = _____

e) $\lim_{p \to 2} \dfrac{2}{p - 2}$ = _____

f) $\lim_{x \to 1^+} f(x)$ = _____ if $f(x) = \begin{cases} x^2 + 1 & \text{if } x < 1 \\ \sqrt{x+3} & \text{if } x \geq 1 \end{cases}$

3. If $\lim\limits_{x \to 2} f(x) = -2$ and $\lim\limits_{x \to 2} g(x) = 3$, find $\lim\limits_{x \to 2} (\sqrt{f^2 + 1}/g)(x) = $ _____

4. Using the given graph, find the following

a) $\lim\limits_{x \to 2^+} f(x) = $ _____

b) $\lim\limits_{x \to -3} f(x) = $ _____

c) $\lim\limits_{x \to 2} f(x) = $ _____

d) $\lim\limits_{x \to 0} f(x) = $ _____

e) $f(-3) = $ _____

f) $\lim\limits_{x \to 2^-} f(x) = $ _____

g) $f(0) = $ _____

h) $\lim\limits_{x \to -3^+} f(x) = $ _____

i) $\lim\limits_{x \to 1^-} f(x) = $ _____

6. Prove the following limit using the precise δ, ε definition of a limit.

$\lim\limits_{x \to 2} (3 - x^2) = -1$