King Fahd University of Petroleum and Minerals
Math. & Stat. Departement
QUIZ # 2

Name	ID	SEC 15	Sr#

Q1) (5 pts) For what value of k the function $f(x)$ has a removable discontinuity at $x = 0$?

$$f(x) = \begin{cases} k - sinx & , \ x < 0 \\ 1 & , \quad x = 0 \\ x^2 - k^2 + 2, & x > 0 \end{cases}$$

Q2)(5 pts) If $f(x) = x^2 + 10\ sinx$, show that there is a number c such that $f(c) = 1000$.

Q3) (5 pts) Find all vertical and horizontal asymptotes of $f(x) = arctan\left(\frac{\sqrt{9x^2+2}}{3x+7}\right)$. Justify your answer by using limits.

Q4)(5 pts) Find the equation of the tangent line to the curve $f(x) = \sqrt{1-2x}$ at $x = -4$.

Q5) (4 pts bounus)Suppose $f(x)$ is a differentiable function that satisfies the following $f(x+y) = f(x) + f(y) + 2xy - 1$ for any real numbers x and y and $\lim_{x\to 0} \frac{f(x)-1}{x} = -2$. Then find $\acute{f}(1)$.