King Fahd University of Petroleum and Minerals
Math. & Stat. Departement
QUIZ # 3

Name	ID	SEC 15	Sr#

Q1) (5 pts) For what values of k and b , the function $f(x)$ is differentiable everywhere ?

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

Q2)(5 pts) Find the equation of the normal line to the curve $y = \sqrt{x}$ that is parallel to the line $2x + y = 1$.

Q3) (5 pts) For what values of a and b is the line $2x + y = b$ tangent to the parabola $y = a\,x^2$ at $x = 2$?

Q4)(5 pts) Evaluate $\lim_{h\to 0} \frac{\sin\left(\frac{\pi}{4}+h\right)tan\left(\frac{\pi}{4}+h\right)-\frac{1}{\sqrt{2}}}{h}$

Q5) (4 pts bounus) If $c > \frac{1}{2}$, how many lines through the point $(0, c)$ are normal lines to the parabola $y = x^2$?