Please show **all** your work! Answers without supporting work will not be given credit.
Clearly mention what theorem(s), if any, you are using.
Write answers in space provided. Use the backside if needed.
You have 14 minutes to complete this Quiz.
You can get MAXIMUM $(5+2)+8=15$ marks.

Name:

1. Find the linear approximation of the function $f(x,y) = \sin(e^{\pi x} - \frac{y}{\pi})$ at $(0,\pi)$ and use that to approximate $f(0.001,\pi)$.

2. A particle travels along the path $\vec{r}(t) = (\sin t, \cos t, t)$. When $t = \pi$ it takes off in the tangential direction to the path and proceeds in a straight line until it hits the plane $x + 2z = 15$. At what point will the particle strike the plane?