Full name: _____ **GT ID:** _____ **Sec:**___

Quiz 5 Version A

You have 15 minutes to take the quiz. No phones, notes, or use aids of any kind is permitted.

1. (4 points) **[Gradient]**
   Find a unit vector in the direction of maximum increase and a unit vector in the direction of maximum decrease for the function $f(x,y) = xe^y + z^2$ at $P(1, \ln 2, \frac{1}{2})$. [AJN]

2. (8 points) **[Tangent Planes and Normal Lines]**
   Find the tangent plane of the surface and the equation of the normal line at the given point. [AJN]

$$z = (x + y + 2)^2, \text{ at } Q(1, 2, 25).$$