Quiz 7 — MA261 — July 20, 2017

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1. (4 points) Find the gradient vector field of $f(x, y, z) = xy^2z$.

2. (6 points) Let $\mathbf{F}(x, y) = \langle 2y, x \rangle$. Integrate $\mathbf{F} \cdot d\mathbf{r}$ along the path $y = x^2$ from $(0, 0)$ to $(1, 1)$.

3. (10 points) For each function $\mathbf{F}$ below, determine whether $\mathbf{F}$ is conservative. If it is, find a function f such that $\mathbf{F} = \nabla f$.

   (a) $\mathbf{F} = \langle 2xy, x^2 + y^2 \rangle$ (b) $\mathbf{F} = \langle xe^y, e^y \rangle$