MATH 261 Quiz 12 Name:
Student number:

Show all work. 5 points each.

1. Use the curl to show that $\mathbf{F}(x, y, z) = \langle y^2z^3, 2xyz^3, 3xy^2z^2 \rangle$ is a conservative vector field . If it is conservative, find f so $\nabla f = \mathbf{F}$.

2. Set up the integral for finding the area of the part of the surface $z = xy$ that lies within the cylinder $x^2 + y^2 = 1$ and then change it to polar coordinates.