Math 2110Q - Multivariable Calculus **Section 16.3 Worksheet**
Name:

1. Complete the sentences:

   (a) A vector field $\mathbf{F}$ is called conservative if

   (b) We can check if a vector field is conservative by checking independence of

   (c) We can check if a vector field is conservative by using partial derivatives to see if

2. Determine whether or not $\mathbf{F}$ is a conservative vector field. If it is, find a function f such that $\mathbf{F} = \nabla f$.

   (a) $\mathbf{F}(x, y) = (y^2 - 2x)\mathbf{i} + 2xy\mathbf{j}$.

   (b) $\mathbf{F}(x, y) = (ye^x + \sin y)\mathbf{i} + (e^x + x\cos y)\mathbf{j}$.

3. Show that the line integral

$$\int_C \sin y dx + (x \cos y - \sin y) dy$$

is independent of path and evaluate the integral where C is any path from $(1, 0)$ to $(2, 1)$.