MATH 224B **NAME:**
Instructor: Junaid Hasan **NET ID:**

Quiz 3
30 minutes

- *Turn off and put away cell phones, graphing calculators, books and notebooks.*
- *You may use one 8.5 by 11 sheet of handwritten notes and a non-graphing calculator. Do not share notes or calculators.*
- *In order to receive credit, you must* **show your work and explain your reasoning,** *and give exact answers.*
- *You can use both sides of the page. Please indicate question number and box your final answer.*
- *When using multiple sheets of paper, please indicate your name on each sheet.*

Question 1

Determine whether $\vec{F}$ is a gradient of a potential(ie, $\vec{F}$ is conservative). If $\vec{F}$ is a gradient of a potential, find the corresponding potential f ie, $\vec{F} = \vec{\nabla} f$.

$$\vec{F} = (\sin y - y\sin(x) + x)\widehat{\mathbf{i}} + (\cos x + x\cos y + y)\widehat{\mathbf{j}}$$

Question 2

Use the Green's theorem to find the area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.