# Math 321 Quiz 3 (G)

March 27/29

*Your Name:* *Your Section:*

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*Instructions: You have 20 minutes to solve the following problems within groups.*

1. Consider the force field $\vec{F}(\vec{r}) = -\frac{y}{x^2+y^2}\vec{e}_x + \frac{x}{x^2+y^2}\vec{e}_y$. A particle moved for one rotation on the circle $C : x^2 + y^2 = r^2$ counterclockwisely. Calculate the work done by the force field on this particle. (6 pts)

2. Consider the sphere $S : x^2 + y^2 + z^2 = r^2$. Calculate $\int_S (\vec{r}/r) \cdot d\vec{S}$ if we parametrize this surface with $\vec{r}(\theta, \phi) = r\sin\theta\cos\phi\vec{e}_x + r\sin\theta\sin\phi\vec{e}_y + r\cos\theta\vec{e}_z$ where $0 \leq \theta \leq \pi, 0 \leq \phi \leq 2\pi$. Explain your answer by relating this to $dS$. (6 pts)

3. Who helped you most in this quiz? Your complaint on this course. (3 pts)