Math 53 Quiz 11

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Name: _____

Time (circle one):   12:10 - 1:00   3:10 - 4:00

Please use extra paper as necessary. For each part, partial credit will be assigned based on correct work (you do need to show some work, enough so that I know how you solved the problem). Please simplify and $\boxed{box}$ *your answers.*

Let $\vec{F}$ be the vector field in $\mathbb{R}^3$ given by

$$\vec{F} = \frac{\vec{r}}{\|\vec{r}\|^3} = \frac{\hat{r}}{r^2}$$

Let S be the plane $\{z = c\}$, where $c > 0$ is an unknown constant, and upward-pointing orientation. Set up (5 points) and integrate (5 points) the surface (or "flux") integral of $\vec{F}$ over S. (Bonus: 1 point for explaining how you could have predicted, without computing the integral, the relationship between c and the value of the integral.)