Problem statement a) Create a two-dimensional force field $\mathbf{F} = M\mathbf{i} + N\mathbf{j}$ defined on all of $\mathbf{R}^2$ *except* $(0,0)$ with the following properties:

i) $\mathbf{F}$ is *always* perpendicular to the level curves of the function $g(x,y) = x^2 + 4y^2$.

ii) The magnitude of $\mathbf{F}$ at (x,y) is inversely proportional to the distance of (x,y) to the origin.

iii) $\mathbf{F}$ at $(1,0)$ is $\mathbf{i}$.

b) Compute $\displaystyle\int_C M\,dx + N\,dy$ where C is the curve given $\begin{cases} x = 2\cos\left(t^{78}\right) \\ y = \sin\left(t^{78}\right) \end{cases}$, $.34 \leq t \leq .56$. (Think physically!)