Math 3298 Worksheet 32: vector line integrals

Group members (2 to 4): _____

(1) Compute the value of the vector line integral $\int_C F \cdot dr$ where $F = (2xy, x^2 + 2yz, y^2 + 2z)$ and C is the path $r(t) = (t, t^2, t^3)$ with $t \in [0, 2]$.

(2) Use Green's theorem ($\oint_C \vec{G} \cdot d\vec{r} = \int\int_R (\frac{\partial G_2}{\partial x} - \frac{\partial G_1}{\partial y})\ dA$, where $G = (G_1, G_2)$) to find a vector field H such that the vector line integral $\int_C G \cdot dr$ is equal to $\int\int_R \text{div } H\ dA$.