Quiz, Nov. 6

Name:

Line Integral. Compute the line integral of $\langle 0, x\rangle$ over the curve C parameterized by

$$\vec{r}(t) = \langle 3\cos t, 3\sin t\rangle$$

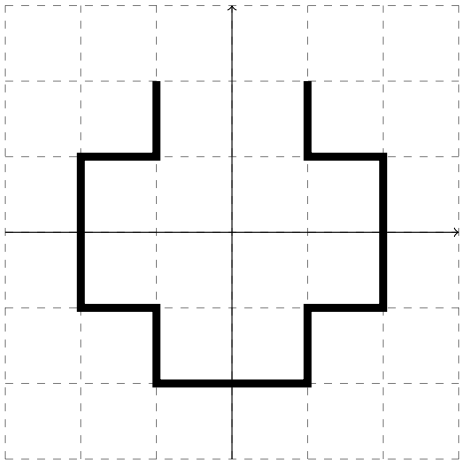
where t goes between 0 and 2π.

Flux Integral, I. Set up, but do not compute, an integral giving the flux of the vector field

$$\langle 4x, 2y^2 + x\rangle$$

through the curve $\langle t^2, t+1\rangle$, where t goes between 0 and 5.

Flux Integral, II. Give the flux of the vector field $\langle x, 0\rangle$ through the curve drawn below. (The grid drawn is a unit grid.)



Bonus Problem. *Worth no points!* If $\vec{F} = \langle P, Q\rangle$, let the *perpendicular field* for $\vec{F}$ be

$$\vec{F}^{\perp} := \langle Q, -P\rangle$$

Relate the curl of $\vec{F}$ to the divergence of $\vec{F}^{\perp}$, and state why Green's theorem and the divergence theorem are related for these two vector fields.