MATH 2574 (Calculus III)
Fall 2015

Name: ______________________

Drill: ______________________

Tues 1 Dec 2015

Quiz 12: Divergence, Curl, and Green's Theorem (§14.4-14.5)

1. **(4 pts)** $\mathbf{F} = \langle e^{-x+y}, e^{-y+z}, e^{-z+x} \rangle$ is a vector field in $\mathbb{R}^3$.

   (a) $\operatorname{curl} \mathbf{F} =$

   (b) $\operatorname{div} \mathbf{F} =$

2. **(2 pts) Green's Theorem:** Let C be a simple closed smooth curve, oriented counterclockwise, that encloses a connected and simply connected region R in the plane. Let $\mathbf{F} = \langle f(x, y), g(x, y) \rangle$ denote a vector field, where f and g have continuous first partial derivatives on R. Then

   (a) Green's Theorem says the circulation of $\mathbf{F}$ on R is (write the equation):

   (b) and that the flux of $\mathbf{F}$ across the boundary of R is (write the equation):

3. **(4 pts)** Let $\mathbf{F} = \langle x - y, -x + 2y \rangle$ denote a vector field on the paralleogram

$$R = \{(x, y) \mid 1 - x \leq y \leq 3 - x, 0 \leq x \leq 1\}.$$

Compute (a) the circulation of $\mathbf{F}$ on R and (b) the outward flux of $\mathbf{F}$ across the boundary of R.