

QUIZ 4  
(November 24, 2008)

NAME: .....

**Problem 1.** Find the work done by the force  $\vec{F}(x, y) = \langle x, x + y \rangle$  on a particle moving along the right semicircle  $\{x^2 + y^2 = 9, x \geq 0\}$  from  $(0, -3)$  to  $(0, 3)$ .

**Problem 2.** Evaluate the line integral  $\int_C \vec{F} \cdot d\vec{r}$  where  $\vec{F}(x, y, z) = \langle z, x - z, x + y \rangle$  and  $C$  is the straight line from  $(1, 1, 1)$  to  $(2, 1, 4)$ .

**Problem 3.** Evaluate the line integral  $\int_C \vec{F} \cdot d\vec{r}$  where  $\vec{F}(x, y) = \langle y + e^x, xy^3 + e^{y+7} \rangle$  and  $C$  is the *clockwise* oriented closed triangular curve with vertices  $(0, 0)$ ,  $(1, 4)$ , and  $(1, 0)$ .

**Problem 4.** Consider the vector field  $\vec{F}(x, y) = \langle \cos y, 1 - x \sin y \rangle$

- (1) Determine if  $\vec{F}$  is conservative;
- (2) If “yes”, find a function  $f(x, y)$  such that  $\vec{F} = \nabla f$ ;
- (3) Evaluate the line integral  $\int_C \vec{F} \cdot d\vec{r}$  where  $C$  is the straight interval connecting  $(1, \pi)$  with  $(2, \frac{\pi}{2})$ .