Name: _____

Quiz

1. Answer the following questions ***and*** provide a reason for your answer:
   a) Can you apply the Fundamental Theorem of line integrals to the function $f(x,y,z) = xy\sin(z)\cos(x^2+y^2)$?

   b) Can you apply the Fundamental Theorem of line integrals to the vector field $\vec{F}(x,y) =< 6xy^2 - 3x^2, 6x^2y + 3y^2 - 2x^3 >$?

   c) Can you apply Green's theorem to a curve C, which is a straight line from (0,0,0) to (1,2,3)?

2. Evaluate the following integrals, using whatever method/shortcut you think is most appropriate (including Maple):
   a) $\int_C \vec{F} \cdot d\vec{r}$ where $\vec{F}(x,y) =< y, x^2 >$ and C is the curve given by $\vec{r}(t) =< 4-t, 4t-t^2 >,\ 0 \le t \le 3$

   b) $\int_C \vec{F} \cdot d\vec{r}$ where $\vec{F}(x,y) =< e^x\cos(y), -e^x\sin(y) >$ and C is the curve $\vec{r}(t) =< 2\cos(t), 2\sin(t) >,\ 0 \le t \le 2\pi$

   c) $\int_C 2xyzdx + x^2zdy + x^2ydz$ where C is some smooth curve from (0,0,0) to (1,4,3)

   d) $\int_C y^3dx + (x^3 + 3xy^2)dy$ where C is the path from (0,0) to (1,1) along the graph of $y = x^3$ and from (1,1) back to (0,0) along the graph of $y = x$.

   e) $\int_C ydx + 2xdy$ where C is the boundary of the square with vertices (0,0), (0,2), (2,0), and (2,2)