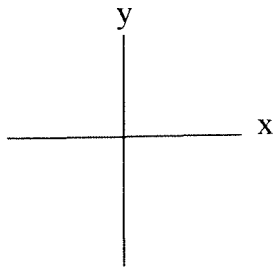


General Directions: Calculators are allowed. Work must be shown to receive full credit for correct answers. Please place answers in the blanks and spaces provided.

_____ 1. (5 pts) Find $\int_C \vec{F} \cdot d\vec{r}$ where $\vec{F} = x\vec{i} + 2zy\vec{j} + x\vec{k}$ and when the curve C is traced out by $\vec{r} = t\vec{i} + t^2\vec{j} + t^3\vec{k}$ for $0 \leq t \leq 1$.

_____ 2. (5 pts) Use the Fundamental Theorem of Line Integrals to calculate $\int_C \vec{F} \cdot d\vec{r}$ if $\vec{F} = 2x\vec{i} - 4y\vec{j} + (2z - 3)\vec{k}$ and C is the line from (1,1,1) to (2,3,-1).

3. Given: $\vec{F} = (x + 3y)\vec{i} + y\vec{j}$

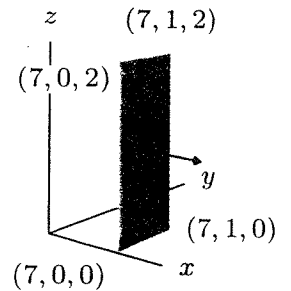


a. (2 pts) Sketch the curves C_1 and C_2 where C_1 is $x = 0, y = t$ for $1 \leq t \leq 1$ and C_2 is $x = \cos t, y = \sin t$ for $\frac{\pi}{2} \leq t \leq \frac{3\pi}{2}$.

_____ b. (1 pt) Evaluate $\frac{\partial F_2}{\partial x} - \frac{\partial F_1}{\partial y}$.

_____ c. (2 pts) Use Green's theorem to evaluate $\oint_C \vec{F} \cdot d\vec{r}$ where $C = C_1 + C_2$.

_____ 4. (5 pts) Compute the flux of the vector field $\vec{v} = 2\vec{i} + 3\vec{j} + 5\vec{k}$ through the rectangular region assuming the indicated orientation.



_____ 5. Using the formula $\int_S \vec{F} \cdot d\vec{A} = \int_R \vec{F}(x, y, f(x, y)) \cdot (-f_x\vec{i} - f_y\vec{j} + \vec{k}) dA$, compute the flux of the vector field $\vec{F} = x\vec{i} + y\vec{j}$ where S is part of the surface $z = f(x, y) = 25 - (x^2 + y^2)$ above the disk of radius 5 centered at the origin oriented up.