

Math 13 Worksheet #12: Line integrals

- (1) Give the vector field that is being integrated.

$$\int_C xy^2 dx + (xy - z)dy + \cos y dz$$

- (2) Compute $\int_C \mathbf{F} \cdot d\mathbf{r}$ where $\mathbf{F}(x, y, z) = \langle yz, x, z^2 \rangle$ with C the straight line segment from the origin to $(1, 0, 4)$.

- (3) Compute $\int_C \mathbf{F} \cdot d\mathbf{r}$ where $\mathbf{F}(x, y) = \langle ye^{xy}, xe^{xy} \rangle$ with C the cardioid $r = 1 + \sin(2\theta)$ from $\theta = -\pi/4$ to $\theta = 3\pi/4$.

- (4) Compute $\int_C \mathbf{F} \cdot d\mathbf{r}$ where $\mathbf{F}(x, y) = \langle 2z + y, x, 2z + 2x \rangle$ with C the curve $\mathbf{r}(t) = \langle t^2, t, 3t \rangle, 1 \leq t \leq 2$.