# Section 16.1 - 16.3 Review

## • Section 16.1 - Vector fields

**Vector field** -

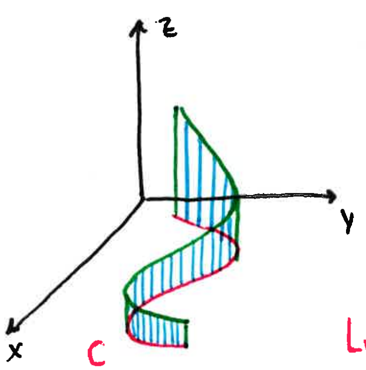
**Ex.**

**Gradient Vector Field** -

**Definitions** - a vector field $\vec{F}$ is conservative if

**Ex.** Find a potential function for the conservative vector field $\vec{F} = \langle \sin x, 2\cos y \rangle$

## • Section 16.2 - Line Integrals




Compute "area of ribbon" - with respect to arclength

Smooth C: $\vec{r} = \langle x(t), y(t) \rangle \quad a \leq t \leq b$

$\Delta S =$

Area of rectangle =

Line Integral of f along C =

Line Integrals with respect to x, y: ☆

☆ $\int_C f(x,y)\,dx =$

Notation:

$\int_C f(x,y)\,dy =$

Line Integral in Space:

Line Integral of Vector Fields:

# Section 16.1 - 16.3 Review

MVC

Ex. Find the work done by the force $\vec{F} = \langle x^2, ye^x \rangle$ on a particle that moves along $x = y^2 + 1$ from $(1,0)$ to $(2,1)$.

- ## Section 16.3 - The Fundamental Theorem for Line Integrals

C - smooth curve given by $\vec{r}(t)$, $a \le t \le b$

f differentiable with $\nabla f$ continuous on C

Path Independence:

Theorems:
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- 
- 

Ex. Show $\vec{F}$ is conservative, find f so $\nabla f = \vec{F}$ and compute $\int_C \vec{F} \cdot d\vec{r}$

$\vec{F} = \langle xy^2, x^2y + 1 \rangle$ C: $\vec{r}(t) = \langle \cos t, 2\sin t \rangle$ $0 \le t \le \pi/2$