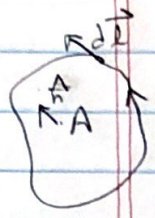
9/5/20

Math Review!



$$\int_A \vec{\nabla}\times\vec{F}\cdot\hat{n}\,dA = \oint \vec{F}\cdot d\vec{\ell}$$ Stokes' theorem

if $\vec{\nabla}\times\vec{F}=0$ $\left(\vec{F}=\vec{\nabla}\Phi,\ \text{so}\ \vec{\nabla}\times\vec{\nabla}\Phi=0\right)$

$$\oint \vec{F}\cdot d\vec{\ell} = 0$$

infinite # of possible curves $\Rightarrow$

line integral is path independent

$$\int_A^B \vec{F}\cdot d\vec{\ell} = \int_A^B \vec{\nabla}\Phi\cdot d\vec{\ell} = \int_A^B d\Phi = \Phi(B)-\Phi(A)$$

$\vec{\nabla}\Phi\cdot d\vec{\ell} = \frac{d\Phi}{d\ell}\,d\ell$