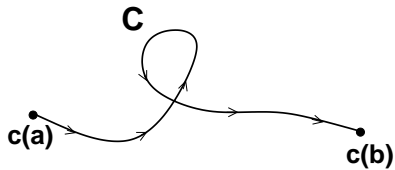


Vector Calculus INTEGRATION THEOREMS

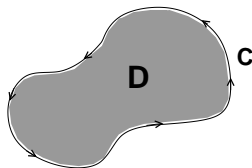
Fundamental Theorem of Calculus: $\int_a^b G'(x) dx = G(b) - G(a).$



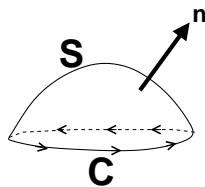
Fundamental Theorem of Calculus for Gradient Fields: $\int_C \nabla f \bullet d\vec{s} = f(\mathbf{c}(b)) - f(\mathbf{c}(a)).$



GREEN'S Theorem: $\iint_D \left(\frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y} \right) dx dy = \int_C P(x, y) dx + Q(x, y) dy.$



STOKES' Theorem: $\iint_S (\nabla \times \tilde{\mathbf{F}}) \bullet d\tilde{\mathbf{S}} = \int_C \tilde{\mathbf{F}} \bullet d\vec{s}.$ Recall $(\nabla \times \tilde{\mathbf{F}}) = \text{curl } \tilde{\mathbf{F}}$



DIVERGENCE Theorem (GAUSS' Theorem): $\iiint_W (\nabla \bullet \tilde{\mathbf{F}}) dV = \iint_S \tilde{\mathbf{F}} \bullet d\tilde{\mathbf{S}}.$ Recall $(\nabla \bullet \tilde{\mathbf{F}}) = \text{div } \tilde{\mathbf{F}}$

