Theorems

* **The Divergence theorem of Gauss:**

This theorem states that if V is the volume bounded by a closed surface S and $\vec{A}$ is a vector function of position with continuous derivatives, then

$$\iiint_V \underline{\nabla} \cdot \underline{A} \, dv = \iint_S \underline{A} \cdot \hat{n} \, ds = \oiint_S \underline{A} \cdot \underline{ds}$$

where $\hat{n}$ is the positive (outward drawn) normal to S.

* **Stoke's theorem:** This theorem states that if S is open, two sided surface bounded by a closed, non-intersecting curve C (simple closed curve) then if $\vec{A}$ ~~A~~ has continuous derivatives

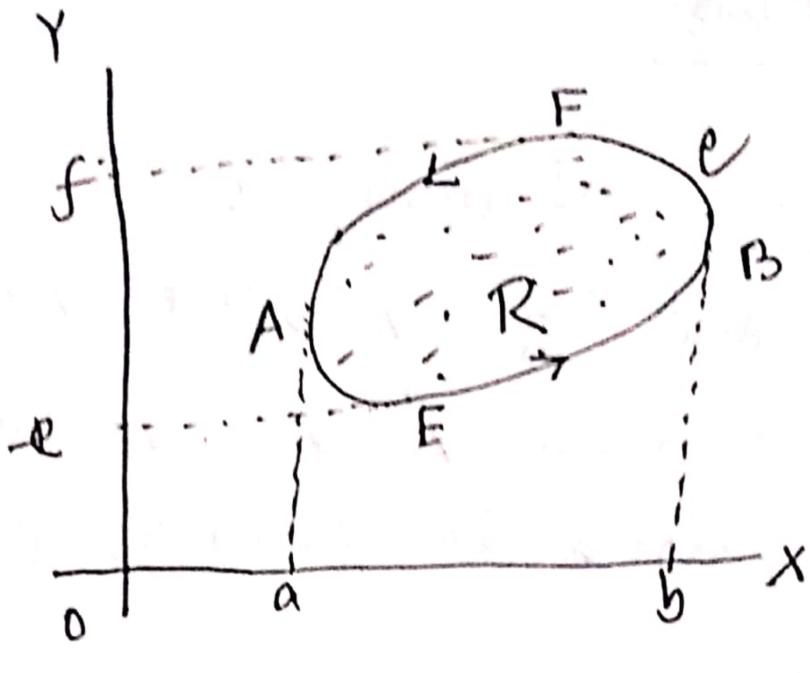
$$\oint_C \underline{A} \cdot \underline{dr} = \iint_S (\underline{\nabla} \times \underline{A}) \cdot \hat{n} \, ds = \iint_S (\underline{\nabla} \times \underline{A}) \cdot \underline{ds}$$

where C is traversed in the positive direction.

* **Green's theorem in the plane:** If R is a closed region in the xy plane bounded by a simple closed curve c and if M & N ~~I~~ are continuous functions of x & y having continuous derivatives in R, then

$$\oint_c M dx + N dy = \iint_R \left(\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y} \right) dx \, dy$$

where c is traversed in positive direction.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