Math 255 Yap Summarization

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Contents

1 Vector Calculus is all about this

Generalized Stokes Theorem

$$\int_{\omega} d\omega = \int_{\partial\Omega} \omega \tag{1}$$

You are integrating over the boundary over the region.

The "thing" you study: $y = f(x)$

The first "derivatives"(s) of that thing: $\frac{dy}{dx} = f'(x)$ (2)

(The differential), "what the things looks like at the infinitesimal level": $dy = f'(x)dx$

When you find the tangent line to a 2D curve, you are taking a differential of $\Delta y = m\Delta x$ which at the infinitesimal becomes a differential: $dy = f'(x)dx$. You can't see the curvature of the earth. You are basically so small that it is near a infinitesimal level so it a appears like a curve.

$$dz = f_x\ dx + f_y\ dy \tag{3}$$

$$dz = \nabla f \cdot dr, \quad dr = \langle f_x, f_y \rangle \tag{4}$$

$$\int_C dz = \int_C \nabla f \cdot d\vec{r} \tag{5}$$