Calculus Basics

Definite vs Indefinite Integral:
A definite integral computes the net area under a curve between two limits, producing a numeric value.
An indefinite integral represents a family of functions (antiderivative) and includes +C.

Mean Value Theorem:
If f is continuous on [a, b] and differentiable on (a, b), then there exists some c in (a, b) such that
$f'(c) = (f(b) - f(a)) / (b - a)$.

Fundamental Theorem of Calculus:
Part 1 links differentiation and integration, showing that the derivative of the integral function equals the integrand.
Part 2 allows evaluation of definite integrals via antiderivatives.

Additional Notes

Integration by Substitution:
Use u-substitution to simplify integrals where u = g(x) appears with its derivative.

Integration by Parts:
$\int u\,dv = uv - \int v\,du$. Choose u and dv appropriately.