CALCULUS REFERENCE GUIDE

MathMaster - Derivatives and Integrals

DERIVATIVE RULES

Constant Rule: d/dx[c] = 0
Power Rule: d/dx[x^n] = nx^(n-1)
Constant Multiple: d/dx[cf(x)] = c*f'(x)
Sum Rule: d/dx[f(x) + g(x)] = f'(x) + g'(x)
Product Rule: d/dx[f*g] = f'g + fg'
Quotient Rule: d/dx[f/g] = (f'g - fg')/g^2
Chain Rule: d/dx[f(g(x))] = f'(g(x))*g'(x)

COMMON DERIVATIVES

d/dx[sin(x)] = cos(x)
d/dx[cos(x)] = -sin(x)
d/dx[tan(x)] = sec^2(x)
d/dx[e^x] = e^x
d/dx[ln(x)] = 1/x
d/dx[a^x] = a^x * ln(a)

INTEGRATION RULES

Power Rule: int x^n dx = x^(n+1)/(n+1) + C, n != -1
int 1/x dx = ln|x| + C
int e^x dx = e^x + C
int sin(x) dx = -cos(x) + C
int cos(x) dx = sin(x) + C
int sec^2(x) dx = tan(x) + C

INTEGRATION TECHNIQUES

U-Substitution: Let u = g(x), du = g'(x)dx
Integration by Parts: int u dv = uv - int v du
Partial Fractions: Decompose rational functions

FUNDAMENTAL THEOREM OF CALCULUS

Part 1: d/dx[int_a^x f(t)dt] = f(x)
Part 2: int_a^b f(x)dx = F(b) - F(a)