Calculus Review: Math 130

Things you should know for Math 131

	Differentiation	Integration
Constant	$\frac{d}{dx} c \cdot f(x) = c \cdot f'(x)$	$\int c \cdot f(x)dx = c\int f(x)dx$
Addition	$\frac{d}{dx}(f(x) + g(x)) = f'(x) + g'(x)$	$\int (f(x) + g(x))dx = \int f(x)dx + \int g(x)dx$
Chain Rule/ Substitution	$\frac{d}{dx} f(g(x)) = f'(g(x)) \cdot g'(x)$ Equivalent: $\frac{df}{dx} = \frac{df}{dg} \cdot \frac{dg}{dx}$	$a = g(x)$ $\int f(g(x)) \cdot g'(x)dx = \int f(a)da$
Product Rule/Parts	$\frac{d}{dx}(f(x) \cdot g(x)) = f'(x) \cdot g(x) + f(x) \cdot g'(x)$	$\int udv = uv - \int vdu$
Quotient Rule	$\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right) = \frac{f'(x) \cdot g(x) - f(x) \cdot g'(x)}{(g(x))^2}$	No separate integration technique, combine parts and substitution.

	Derivative	Integral
$f(x) = a$ constant	$\frac{d}{dx}(a) = 0$	$\int adx = a \cdot x + c$
$f(x) = x^a$ power rule	$\frac{d}{dx}(x^a) = ax^{a-1}$	$\int x^a dx = \frac{x^{a+1}}{a+1} + c$ $a \neq -1$
$f(x) = \ln(x)$ natural logarithm	$\frac{d}{dx}(\ln(x)) = \frac{1}{x}$	$\int \frac{1}{x}dx = \ln(x) + c$
$f(x) = e^x$ exponential	$\frac{d}{dx}(e^x) = e^x$	$\int e^x dx = e^x + c$

Suggested Review: Definition of the derivative, Fundamental Theorem of Calculus, Definite integrals, Properties of logarithms and exponents.

Notes: