

075 & 076 Log and exponential – differentiation and integration

Exponential functions:

	With chain rule:	Integral:
$y = e^x$ $\frac{dy}{dx} = e^x$	$y = e^u$ $\frac{dy}{dx} = e^u \frac{du}{dx}$	$\int e^x dx = e^x + C$
$y = a^x$ $\frac{dy}{dx} = (\ln a)a^x$	$y = a^u$ $\frac{dy}{dx} = (\ln a)a^u \frac{du}{dx}$	$\int a^x dx = \frac{1}{\ln a} a^x + C$

Log functions:

	With chain rule:	Integral:
$y = \ln x$ $\frac{dy}{dx} = \frac{1}{x}$	$y = \ln f(x)$ $\frac{dy}{dx} = \frac{f'(x)}{f(x)}$	$\int \frac{1}{x} dx = \ln x + C$ $\int \frac{f'(x)}{f(x)} dx = \ln f(x) + C$
$y = \log_b x$ $\frac{dy}{dx} = \frac{1}{\ln b} \frac{1}{x}$	$y = \log_b f(x)$ $\frac{dy}{dx} = \frac{1}{\ln b} \frac{f'(x)}{f(x)}$	