Derivatives:

Function $f(x)$	Derivative $f'(x)$
x^n	$n \cdot x^{n-1}$
b^x	$(\ln b) \cdot b^x$
e^x	e^x
$\ln(x)$	$\dfrac{1}{x}$
$\sin(kx)$	$k\cos(kx)$
$\cos(kx)$	$-k\sin(kx)$

Indefinite integral:

Function $f(x)$	$\int f(x)\ dx$
x^n , $(n \neq -1)$	$\dfrac{x^{n+1}}{n+1} + C$
$\dfrac{1}{x}$	$\ln\lvert x\rvert + C$
b^x	$\dfrac{b^x}{\ln(b)} + C$
e^{kx}	$\dfrac{e^{kx}}{k} + C$
$\sin(kx)$	$-\dfrac{1}{k}\cos(kx) + C$
$\cos(kx)$	$\dfrac{1}{k}\sin(kx) + C$

Chain Rule: $\big(f(g(x))\big)' = f'(g(x)) \cdot g'(x)$

Product Rule: $\big(f(x)g(x)\big)' = f'(x)g(x) + f(x)g'(x)$

Evaluate the definite integrals:

Example 1. Find $\displaystyle\int_1^2 \frac{4x^5+6}{x^2}\ dx$

Example 2. Find $\displaystyle\int_0^{\pi} \sin 3x\ dx$

Example 3. Find $\displaystyle\int_0^1 e^{2x}\ dx$

Example 4. Show that $\ln x = \displaystyle\int_1^x \frac{1}{t}\ dt$

Find the derivative of the following functions.

Example 5. $f(x) = \displaystyle\int_3^{2x^3-1} \sin(2t)\ dt$

Example 6. $f(x) = \displaystyle\int_1^{x^2} e^{t^2}\ dt$