4.10 Antiderivatives

1. The derivative of a function f is f'. The inverse operation gives that the antiderivative of f' is f
2. For a given function, the antiderivtive is not unique:
   Example: consider $f(x) = x^2$.
   Some antiderivative are $f(x) = \frac{x^3}{3} + 7$ or $f(x) = \frac{x^3}{3} - 37$.
   There are actually infinitely many of them for each constant you add to $\frac{x^3}{3}$.
   Thus, generally the antiderivative of x^2 is $f(x) = \frac{x^3}{3} + C$, where C is a constant
3. Some standard antiderivatives, that you may obtain by taking inverse operation of derivatives:

Function	Particular antiderivative	Function	Particular antiderivative
$cf(x)$	$cF(x)$	$\sin x$	$-\cos x$
$f(x) + g(x)$	$F(x) + G(x)$	$\sec^2 x$	$\tan x$
$x^n \ (n \neq -1)$	$\frac{x^{n+1}}{n+1}$	$\sec x \tan x$	$\sec x$
$\frac{1}{x}$	$\ln\lvert x\rvert$	$\frac{1}{\sqrt{1-x^2}}$	$\sin^{-1} x$
e^x	e^x	$\frac{1}{1+x^2}$	$\tan^{-1} x$
b^x	$\frac{b^x}{\ln b}$	$\cosh x$	$\sinh x$
$\cos x$	$\sin x$	$\sinh x$	$\cosh x$