Basic Differentiation & Antidifferentiation a Summary of the Basic Rules

$f'(x)$ derivative	$f(x)$ function	$F(x)$ antiderivative	
0	a	$ax + C$	
1	x	$\frac{1}{2}x^2 + C$	
$2x$	x^2	$\frac{1}{3}x^3 + C$	
$3x^2$	x^3	$\frac{1}{4}x^4 + C$	
$\frac{1}{2\sqrt{x}}$	$\sqrt{x}$	$\frac{2}{3}x^{3/2} + C$	
$\frac{1}{3}x^{-2/3}$	$\sqrt[3]{x}$	$\frac{3}{4}x^{4/3} + C$	
nx^{n-1}	x^n	$\frac{x^{n+1}}{n+1} + C$	$(n \neq -1)$
$\frac{-1}{x^2}$	$\frac{1}{x}$	$\ln\lvert x\rvert + C$	$(n = -1)$
$\cos(x)$	$\sin(x)$	$-\cos(x) + C$	
$-\sin(x)$	$\cos(x)$	$\sin(x) + C$	
e^x	e^x	$e^x + C$	
$\ln(a)\,a^x$	a^x	$\frac{a^x}{\ln(a)} + C$	
We derive these they're not "basic"	$\sec^2(x)$	$\tan(x) + C$	
	$\csc^2(x)$	$-\cot(x) + C$	
	$\sec(x)\tan(x)$	$\sec(x) + C$	
	$\frac{1}{\sqrt{1-x^2}}$	$\sin^{-1}(x)$	
	$\frac{1}{1+x^2}$	$\tan^{-1}(x)$	

In each case $F'(x) = f(x)$ as required by def^n of antiderivative.