Appendix B. Some Derivatives and Derivative Rules

1. $\frac{d}{dx}c = 0$, c any constant.
2. $\frac{d}{dx}x^a = ax^{a-1}$, a any constant: the Power Rule.
3. $\frac{d}{dx}\sqrt{x} = \frac{1}{2\sqrt{x}}$, the case $a = -1/2$ of the Power Rule.
4. $\frac{d}{dx}\sin x = \cos x$.
5. $\frac{d}{dx}\cos x = -\sin x$.
6. $\frac{d}{dx}\tan x = \sec^2 x$.
7. $\frac{d}{dx}\sec x = \tan x \sec x$.
8. $\frac{d}{dx}e^x = e^x$ and $\frac{d}{dx}a^x = (\ln a)a^x$.
9. $\frac{d}{dx}\ln x = \frac{1}{x}$ for $x > 0$; and $\frac{d}{dx}\ln|x| = \frac{1}{x}$ for $x \neq 0$.

Some rules

10. $\frac{d}{dx}[cf(x)] = c\frac{d}{dx}f(x)$, c any constant.
11. $\frac{d}{dx}[f(x) + g(x)] = \frac{d}{dx}f(x) + \frac{d}{dx}g(x)$.
12. $\frac{d}{dx}[f(x) - g(x)] = \frac{d}{dx}f(x) - \frac{d}{dx}g(x)$.
13. $\frac{d}{dx}[f(x) \cdot g(x)] = \frac{d}{dx}f(x) \cdot g(x) + f(x) \cdot \frac{d}{dx}g(x)$.
14. $\frac{d}{dx}\frac{f(x)}{g(x)} = \frac{\frac{d}{dx}f(x) \cdot g(x) - f(x) \cdot \frac{d}{dx}g(x)}{[g(x)]^2]}$.
15. $[f(g(x))' = f'(g(x)) \cdot g'(x)$. or $\frac{d}{dx}[f(u)] = \frac{df}{du}\frac{du}{dx}$, where $u = g(x)$.

Appendix C. Some Indefinite Integrals and Rules

In the following table, F is some antiderivative of f, G is some antiderivative of g, c is any constant, and the domain is any interval within the natural domain of the function. For example, for $1/x$, the domain is any interval within $(0, \infty)$ or $(-\infty, 0)$, not all of "$x \neq 0$".

$f(x)$	$\int f(x)\,dx$
x^n, $n \neq -1$	$\dfrac{x^{n+1}}{n+1} + C$
$1/x$	$\ln \lvert x \rvert + C$
$\sin x$	$-\cos x + C$
$\cos x$	$\sin x + C$
$\tan x$	$\ln \lvert \sec x \rvert + C$
$\sec^2 x$	$\tan x + C$
$\tan x \sec x$	$\sec x + C$
e^x	$e^x + C$
a^x	$\dfrac{1}{\ln a} a^x + C$
$f + g$	$\int f(x)\,dx + \int g(x)\,dx$
$f - g$	$\int f(x)\,dx - \int g(x)\,dx$
cf	$c \int f(x)\,dx$