FORMULA SHEET

Quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Index laws

$a^m \times a^n = a^{m+n}$ $\quad \frac{a^m}{a^n} = a^{m-n} \quad (a \neq 0)$

$(ab)^n = a^n b^n$ $\quad \left(\frac{a}{b}\right)^n = \frac{a^n}{b^n} \quad (b \neq 0)$

$a^0 = 1 \quad (a \neq 0)$ $\quad a^1 = a$

$a^{-n} = \frac{1}{a^n} \quad (a \neq 0)$ $\quad \frac{1}{a^{-n}} = a^n$

Log. laws

$\log_a m + \log_a n = \log_a(mn)$

$\log_a m - \log_a n = \log_a\left(\frac{m}{n}\right)$

$c \log_a b = \log_a b^c$

$\log_a 1 = 0$

$\log_a a = 1$

$\ln(e^x) = x$ $\quad e^{\ln x} = x$

Trigonometric Ratios

θ	$\sin\theta$	$\cos\theta$	$\tan\theta$
$\frac{\pi}{6} = 30°$	$1/2$	$\sqrt{3}/2$	$1/\sqrt{3}$
$\frac{\pi}{4} = 45°$	$1/\sqrt{2}$	$1/\sqrt{2}$	1
$\frac{\pi}{3} = 60°$	$\sqrt{3}/2$	$1/2$	$\sqrt{3}$

$\cos^2\theta + \sin^2\theta = 1$

Derivative rules

The Product Rule
If $y = f(x) = u(x)v(x)$, then

$$\frac{dy}{dx} = u\frac{dv}{dx} + v\frac{du}{dx}$$

The Quotient Rule
If $y = f(x) = \frac{u(x)}{v(x)}$ then

$$\frac{dy}{dx} = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$$

The Chain Rule
If $y = f(u)$, and $u = g(x)$, then

$$\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$$

Table of Derivatives

Function (y)	Derivative $\left(\frac{dy}{dx}\right)$
x^n	nx^{n-1}
$\sin kx$	$k\cos kx$
$\cos kx$	$-k\sin kx$
e^{kx}	ke^{kx}
$\ln x$	$\frac{1}{x}$

Table of Integrals

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