THE UNIVERSITY OF SYDNEY
Semester 2, 2012

Parlial list of Assumed Knowledge for **MATH1013 Mathematical Modelling**

Note that this is only a parital list.

Differentiation

- $\frac{d(x^n)}{dx} = nx^{n-1}$
- $\frac{d(\sin(x))}{dx} = \cos(x)$
- $\frac{d(\cos(x))}{dx} = -\sin(x)$
- $\frac{d(ln(f(x)))}{dx} = \frac{f'(x)}{f(x)}$
- $\frac{d(e^{f(x)})}{dx} = f'(x)e^{f(x)}$
- Product rule: if $f(x) = u(x)v(x)$ then $f'(x) = u'v + v'u$.
- Quotient rule: if $f(x) = \frac{u(x)}{v(x)}$ then $f'(x) = \frac{u'v - v'u}{v^2}$.
- Chain rule: if $f(x) = h(g(x))$ then $f'(x) = g'(x)h'(g(x))$

Integration

- $\int x^n dx = \frac{x^{n+1}}{n+1} + C$ if $n \neq -1$
- $\int x^{-1} dx = ln|x| + C$

- $\int \frac{1}{ax+b}dx = \frac{1}{a}ln|ax+b| + C$
- $\int e^{ax+b}dx = \frac{1}{a}e^{ax+b} + C$
- $\int \sin(x)dx = -\cos(x) + C$
- $\int \cos(x)dx = \sin(x) + C$