SET THEORY

$$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$$

$$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$$

$$\overline{\bar{A} \cap \bar{B}} = A \cup B \qquad \overline{\bar{A} \cup \bar{B}} = A \cap B$$

$$\overline{A \cap B} = \bar{A} \cup \bar{B} \qquad \overline{A \cup B} = \bar{A} \cap \bar{B}$$

$$A \cap A = A \qquad A \cap A' = \phi \qquad A \cup A' = S$$

$$A \cap U = A \qquad A \cup U = U$$

$$A \cap \phi = \phi \qquad A \cup \phi = A$$

SUMS and PRODUCTS

$$\sum_{i=1}^{n} a = n \cdot a$$

$$\sum_{i=1}^{n} c \cdot a_i = c \sum_{i=1}^{n} a_i$$

if context clear, can omit ranges

$$\sum (a_i + b_i) = \sum a_i + \sum b_i$$

$$a_1 + a_2 + \dots + a_n = \sum_{i=1}^{n} a_i = \sum a_i$$

should be able to convert

$$a_1 \times a_2 \times \dots \times a_n = \prod_{i=1}^{n} a_i = \prod a_i$$

with context

$$\prod c a_i = c^n \prod a_i$$

$$\prod (a_i b_i) = \left(\prod a_i\right)\left(\prod b_i\right)$$

$$n! = n \times (n-1) \times \dots \times 1 = \prod_{i=1}^{n} i$$

$$\binom{n}{p} = \frac{n!}{(n-p)!\,p!}$$

$$(a+b)^n = a^n + \binom{n}{2} a^{n-1} b + \dots + b^n$$

LOGS and EXPONENTS

$$\ln(e^x) = x$$

$$e^{\ln x} = x \quad \text{if } x > 0$$

$$e^{a+b} = e^a e^b \qquad e^{\sum a_i} = \prod e^{a_i}$$

$$\ln(ab) = \ln a + \ln b \qquad \ln\left(\prod a_i\right) = \sum \ln a_i$$

$$e^{nx} = (e^x)^n \neq e^{(x^n)}$$

$$\ln(x^n) = n \ln x$$

CALCULUS

and the equivalent inverses using integration

$$\frac{d}{dx} x^n = n \cdot x^{n-1}$$

$$\frac{d}{dx} \sin x = \cos x$$

$$\frac{d}{dx} \cos x = -\sin x$$

$$\frac{d}{dx} e^x = e^x$$

$$\frac{d}{dx} \ln x = \frac{1}{x}$$

$$\frac{d}{dx} f(g(x)) = g'(x) f'(g(x))$$

Should also be to use wolfram alpha (or calculator) to calculate derivatives and integrals (definite & indefinite) for more complex functions.

HADLEY
H.WICKHAM@GMAIL.COM
WWW.HAD.CO.NZ