Mathematical Formulae and Symbols

The following tables are a non-exhaustive list of suggested keystrokes to use in place of the mathematical formulae and symbols in Word.

These keystrokes are most likely to be of use in subjects CM1, CM2, CS1, CS2, SP6 and SP9 but all candidates are advised to be familiar with them as part of exam preparation.

You may use alternate sensible notation so long as it is recognisable to markers. You are permitted to copy and paste the IFoA standard keyboard notation into your exam submission should that assist you in answering your exam paper.

You may also use the equation editor function within Word if you wish to do so. It is recommended you familiarise yourself with common keystrokes used by reviewing past papers and examiner reports for the relevant subject.

The list has been grouped into four key areas as follows:

- General mathematical notation.
- Statistical notation.
- Compound interest functions.
- Life table functions.

Notation or Meaning	Standard Keyboard Symbol / Notation that may be used
General mathematical notation	
Multiplication, ×	*
Division, ÷	/
Approximately equal, ≈	~=

Notation or Meaning	Standard Keyboard Symbol / Notation that may be used
	OR; approx. = OR; c. =
Inequalities e.g. a ≥ b and c ≤ d	a >= b and c <= d
Proportionality, a ∝ b	a is proportional to b
Square root $\sqrt{\ldots}$	sqrt(…)
Superscripted letters, a^x	a^x
Subscripted letters, e.g. X_{ij}	X_ij OR; Xij
Exponential, e^x	exp(x) OR; e^x
Accented symbols, e.g. $\hat{b}$, $\bar{X}$	b^hat, X^bar OR; bhat, Xbar
Greek letters, e.g. $\mu, \sigma, \alpha, \beta, \theta, \varphi, \lambda, \eta, \rho, \delta$	Use the typed word for the letter e.g. mu, sigma, alpha, beta, theta, phi, lambda, eta, rho, delta. Match case of Greek letter, for example phi for φ and PHI for Φ. OR; an Arabic alternative where available e.g. a instead of alpha, b instead of beta, d for delta or D for DELTA.
Symbols, e.g. infinity symbol, ∞	Infinity OR; Inf

Notation or Meaning	Standard Keyboard Symbol / Notation that may be used
Derivatives, e.g. $f'(x), f''(x)$, δf/δs	f'(x), f''(x), df/ds (stating partial, if necessary) OR; df/dx, d^2f/dx^2
Integral, e.g. $\int_a^b f'(t)dt$ and Solved Integral, e.g. $= [f(t)]_a^b$	INT(a,b):f'(t) dt OR; Integral over a to b (f'(t)) OR; int(a,b)[f'(t)] = [f(t)]:(a,b)
Summation, e.g. $\sum_{t=a}^{b} \mu_t$	sigma(a,b): mu(t) OR; sum(a,b): mu(t) OR; Sum over a to b (mu(t)) OR; Sum(a,b)[mu(t)]
Product, e.g. $\prod_a^b f(x)$	Product (a,b):f(x) OR; product over a to b(f(x))
Statistical notation	
Expected values e.g. $E(\dots)$	E(…)
Conditional expectation, e.g. $E(X\|Y)$	E(X given Y)

Notation or Meaning	Standard Keyboard Symbol / Notation that may be used
Variance, $V(\ldots)$	V(…)
Covariance, *Cov*(…)	Cov(…)
Distributions, e.g. χ^2_m	chi-squared_m OR; chi-squared with m degrees of freedom
Binomial Coefficient, e.g. $\binom{n}{r}$	n choose r OR; choose (n, r)

Notation or Meaning	Standard Keyboard Symbol / Notation that may be used
Compound interest functions	
$i^{(p)}$	i(p)
$d^{(p)}$	d(p)
δ	delta
v^n	v^n
$s_{\overline{n}\rceil}$	s:<n>
$\bar{a}_{\overline{n}\rceil}$	abar:<n>
$a^{(p)}_{\overline{n}\rceil}$	a(p):<n>
Life table functions	

Notation or Meaning	Standard Keyboard Symbol / Notation that may be used
$\frac{l_y}{l_x}$	Ly/Lx
$\frac{d_x}{l_y}$	dx/Ly
${}_k p_x$	kpx
${}_{m\|}q_x$	m|qx
p_{xy}	px:y
$\ddot{a}_{x:\overline{n\|}}$	adue:x:<n>
$a_x^{(p)}$	a(p):x
$\ddot{a}_{x:y}$	adue:x:y
$\ddot{a}_{x:y:\overline{n\|}}$	adue:x:y:<n>
$\ddot{a}^{(p)}_{x:y:\overline{n\|}}$	adue(p):x:y:<n>
$\ddot{a}_{x\|y}$	adue:x|y
${}_{m\|}\ddot{a}_x$	m|adue:x

Notation or Meaning	Standard Keyboard Symbol / Notation that may be used
$A_{x:\overline{n}\rceil}$	EA:x:<n>
$\bar{A}_{x:\overline{n}\rceil}$	EAbar:x:<n>
$A_{1\ x:\overline{n}\rceil}$	TA:x:<n>
$A_{[x]:\overline{n}\rceil}^{1}$	PE:[x]:<n>
$(IA)_{x:\overline{n}\rceil}^{1}$	I(TA):x:<n>