



# General Mathematics Examination 1

## 2024 Formula Sheet

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You may keep this Formula Sheet.

**Data analysis**

standardised score	$z = \frac{x - \bar{x}}{s_x}$
lower and upper fence in a boxplot	lower $Q1 - 1.5 \times IQR$ upper $Q3 + 1.5 \times IQR$
least squares line of best fit	$y = a + bx, \quad \text{where} \quad b = r \frac{s_y}{s_x} \quad \text{and} \quad a = \bar{y} - b\bar{x}$
residual value	residual value = actual value – predicted value
seasonal index	$\text{seasonal index} = \frac{\text{actual figure}}{\text{deseasonalised figure}}$

**Recursion and financial modelling**

first-order linear recurrence relation	$u_0 = a, \quad u_{n+1} = Ru_n + d$
effective rate of interest for a compound interest loan or investment	$r_{\text{effective}} = \left[ \left( 1 + \frac{r}{100n} \right)^n - 1 \right] \times 100\%$

**Matrices**

determinant of a $2 \times 2$ matrix	$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}, \quad \det A = \begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc$
inverse of a $2 \times 2$ matrix	$A^{-1} = \frac{1}{\det A} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}, \quad \text{where } \det A \neq 0$
recurrence relation	$S_0 = \text{initial state}, \quad S_{n+1} = T S_n + B$
Leslie matrix recurrence relation	$S_0 = \text{initial state}, \quad S_{n+1} = L S_n$

**Networks and decision mathematics**

Euler's formula	$v + f = e + 2$
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