MATHEMATICS APPLICATIONS
ATAR COURSE

FORMULA SHEET

2018

Statistics

Bivariate data	
Residual value	observed value – predicted value = $y - \hat{y}$
Least-squares line	$\hat{y} = a + bx$ where y is the response variable and x is the explanatory variable or $\hat{y} = a + bt$ where y is the response variable and t is time (the explanatory variable)
Periodic time series	
Deseasonalised value = $\dfrac{\text{Actual value}}{\text{Seasonal index}}$	

Growth and decay in sequences

Arithmetic sequence	$T_1 = a, \quad T_n = a + (n-1)d \qquad d = T_{n+1} - T_n$
Geometric sequence	$T_1 = a, \quad T_n = ar^{(n-1)} \qquad r = \dfrac{T_{n+1}}{T_n}$
First-order linear recurrence relation	$T_1 = a, \quad T_{n+1} = bT_n + c \qquad \text{for} \qquad n \geq 1$

Graphs, networks and decision mathematics

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

Loans, investments and annuities

Simple interest	$I = Prt$
Compound interest	$A = P(1+r)^t$ compounded annually $A = P\left(1 + \dfrac{r}{n}\right)^{nt}$ compounded n times a year
Effective annual rate of interest	$i_{effective} = \left(1 + \dfrac{i}{n}\right)^n - 1$

Note: *Any additional formulas identified by the examination panel as necessary will be included in the body of the particular question.*