

## OCR A Level Mathematics – S1 Scheme of Work

For examination in **June of Year 13 and is taught over 1 lesson a week.** The number of lessons given in this Scheme of Work for each unit is approximate.

### REPRESENTING DATA 1 & 2 (6 lessons)

Topic	Objectives	Text - Cambridge S1	Number of lessons
Representing data 1  <i>Should be basic revision – pupils should review this themselves over summer</i>	Construct the following types of diagram and know the advantages and/ or disadvantages associated with a particular representation. <ul style="list-style-type: none"> <li>➤ Stem-and-leaf diagram (including back-to-back)</li> <li>➤ Histograms</li> <li>➤ Cumulative frequency graphs.</li> <li>➤ Box plots</li> </ul> Interpret a statistical graph and use a diagram to extract particular features (such as the medians and the inter-quartile range).  Calculate measures of location – median, mean and mode from a set of data, frequency and grouped frequency tables and compare sets of data, for example commenting on the medians, the spread and the skewness.	Ex 1A, Ex1B, Ex1C  Ex 3A (Covers box plots and measures of spread)  Ex 2A, 2B, 2C, Misc Ex 2.	2-3
<b>Assessment – Representing data 1</b>			
Topic	Objectives	Text Cambridge S1	Number of lessons
Representing data 2	Students should be able to calculate the median and standard deviation (or variance) from raw data, a frequency table and from summary statistics. They should understand the effect of coding on the mean and s.d. and should be able to solve problems (such as pooling two sets of data to find a combined mean and s.d.).  They should know which average and which measure of variation is most appropriate in different situations.	Ex 2B, Ex 2C Ex 3B, 3C, Misc Ex 3	3
<b>Assessment – Representing data 2 - Measures and location</b>			

## **PROBABILITY (3 lessons)**

<b>Topic</b>	<b>Objectives</b>	<b>Text Cambridge S1</b>	<b>Number of lessons</b>
Probability	Students should be able to evaluate probabilities in simple cases by means of enumeration of elementary events (e.g. for the total score when two fair dice are thrown). They should use addition and multiplication laws of probability, as appropriate, in simple cases. They should understand informally the meaning of exclusive and independent events, and calculate and use conditional probabilities in simple cases, e.g. situations that can be represented by means of a tree diagram.	Exercise 4A Exercise 4B Misc Ex 4	2-3

**Assessment - Probability**

## PERMUTATIONS AND COMBINATIONS (4 lessons)

Topic	Objectives	Text Cambridge S1	Number of lessons
Permutations and combinations	Students should be able to: <ul style="list-style-type: none"><li>➤ understand the terms permutation and combination</li><li>➤ solve problems about selections, e.g. finding the number of ways in which a team of 3 men and 2 women can be selected from a group of 6 men and 5 women.</li><li>➤ solve problems about arrangements of objects in a line, including those involving:<ol style="list-style-type: none"><li>a) repetition (e.g. the number of ways of arranging the letters in the word “NEEDLESS”;</li><li>b) restriction (e.g. the number of ways several people can stand in a line if 2 people must, or must not, stand next to each other.</li></ol></li><li>➤ evaluate probabilities using permutations and combinations.</li></ul>	Exercise 5A Exercise 5B Exercise 5C Misc Ex 5	4
<b>Assessment – Permutations &amp; combinations</b>			

## DISCRETE RANDOM VARIABLES (3 lessons)

Topic	Objectives	Text Cambridge S1	Number of lessons
Discrete random variables	Students should be able to <ul style="list-style-type: none"><li>➤ construct a probability distribution table relating to a given situation involving a discrete random variable <math>X</math></li><li>➤ calculate the expectation, variance and standard deviation of <math>X</math></li><li>➤ solve problems involving discrete r.v.s (for example finding missing probabilities when given the expectation).</li></ul>	Exercise 6A, 6B, 6C, Misc Ex 6  Exercise 8A	3-4
<b>Assessment – Discrete random variable</b>			

## **BINOMIAL AND GEOMETRIC DISTRIBUTIONS (5 lessons)**

<b>Topic</b>	<b>Objectives</b>	<b>Text Cambridge S1</b>	<b>Number of lessons</b>
Binomial distribution	Students should know: <ul style="list-style-type: none"> <li>➤ the assumptions that are needed for a binomial to be an appropriate model;</li> <li>➤ how to calculate probabilities from the formula or from cumulative binomial tables;</li> <li>➤ how to use the formulae for the expectation and variance of a binomial distribution.</li> </ul>	Exercise 7A Exercise 8B	3
Geometric distribution	Students should know: <ul style="list-style-type: none"> <li>➤ the assumptions that are needed for a geometric to be an appropriate model;</li> <li>➤ how to calculate probabilities from the formula</li> <li>➤ how to use the formulae for the expectation and variance of a geometric distribution.</li> </ul>	Exercise 7B Exercise 8B	2
<b>Assessment – Binomial Geometric distributions</b>			

## **CORRELATION (4 lessons)**

<b>Topic</b>	<b>Objectives</b>	<b>Text Cambridge S1</b>	<b>Number of lessons</b>
Correlation	Students should be able to: <ul style="list-style-type: none"> <li>➤ calculate and interpret the value of the product moment correlation coefficient from raw and summarised bivariate data</li> <li>➤ calculate and interpret the value of Spearman's rank correlation coefficient</li> <li>➤ gauge the approximate value of the PMCC or of Spearman's rank from a scatter graph (particularly values close to -1, 0 or 1);</li> <li>➤ understand that the value of a correlation coefficient is unaffected by linear transformations of the variables.</li> </ul>	Exercise 9A Exercise 9B Exercise 9C Exercise 9D Misc Ex 9	4-5
<b>Assessment - Correlation</b>			

## REGRESSION (3 lessons)

Topic	Objectives	Text Cambridge S1	Number of lessons
Regression	Students should: <ul style="list-style-type: none"><li>➤ understand the difference between an independent and a dependent variable</li><li>➤ understand the concepts of least squares and regression lines in the context of a scatter diagram</li><li>➤ calculate, both from simple raw data and from summarised data, the equation of a regression line, understand the distinction of the regression line of <math>y</math> on <math>x</math> and that of <math>x</math> on <math>y</math>, and use the fact that both regression lines pass through the mean centre.</li><li>➤ select and use, in the context of a problem, the appropriate regression line to estimate a value, and be able to interpret in context the uncertainties of such estimations.</li></ul>	Exercise 10A Exercise 10B Exercise 10C Misc Ex 10	3-4

**Assessment - Regression**

Revision – Practice as many past papers as possible.