

OCR A Level Further Mathematics – Statistics 2 Scheme of Work

Examination in June of Year 13.

The number of lessons stated is for teaching the unit is a guide.

DISTRIBUTIONS (7 lessons)

Topic	Syllabus	Text	Lessons
Poisson distribution	Calculate probabilities for the distribution $Po(\mu)$, both directly from the formula and also by using tables of cumulative Poisson probabilities. Understand the relevance of the Poisson distribution to the distribution of random events, and use the Poisson distribution as a model.	S2 Chapter 3.1-3.2 Ex. 3A, pg. 56 Ex. 3B-1, pg.62	1
	Use the result that if $X \sim Po(\mu)$ then the mean and variance of X are equal to μ .	S2 Chapter 3.3 Ex. 3B, pg.62	1
	Use the Poisson distribution as an approximation to the binomial distribution where appropriate ($n > 50, np < 5$ approx.).	S2 Chapter 3.5 Ex. 3C, pg. 66	1
Assesment – Poisson Distribution			
Normal distribution	Understand the use of a normal distribution to model a continuous random variable, and use normal distribution tables. Solve problems concerning a variable X , where $X \sim N(\mu, \sigma^2)$, including <ul style="list-style-type: none"> • finding the value of $P(X > x)$, or a related probability; • finding a relationship between x, μ, σ given the value of $P(X > x)$ or a related probability. 	S2 Chapter 2.1-2.7 Ex. 2A, pg. 30 Ex. 2B, pg. 33 Ex. 2C, pg. 36 Ex. 2D, pg. 39	3
	Recall conditions under which the normal distribution can be used as an approximation to the binomial distribution, and use this approximation, with a continuity correction, in solving probabilities ($np > 5, nq > 5$ approx.). Use the normal distribution, with a continuity correction, as an approximation to the Poisson distribution where appropriate ($\mu > 15$ approx).	S2 Chapter 2.8 Ex. 2E, Misc. Ex. 2, pg. 46 S2 Chapter 3.6 Ex. 3D, Misc. Ex. 3, pg. 69	1
Assessment - Normal Distribution			

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HYPOTHESIS TESTS FOR DISCRETE RANDOM VARIABLES (7 lessons)

Topic	Syllabus	Text	Lessons
Hypothesis tests	Understand the nature of a hypothesis test, the difference between one-tail and two-tail tests, and the terms “null hypothesis”, “alternative hypothesis”, “significance level”, “rejection region” (or “critical region”). Formulate hypotheses and carry out a test of a population proportion in the context of a single observation from a binomial distribution, using either direct calculation of the probabilities or a normal approximation with continuity correction. Formulate hypotheses and carry out a hypothesis test of a population mean based on a single observation from a Poisson distribution, using direct evaluation of Poisson probabilities.	S2 Chapter 6 Ex. 6A, pg. 126 Ex. 6B, pg. 129 Ex. 6C, Misc. Ex. 6, pg. 132	5
Errors	Understand the terms “type I error” and “type II error” in relation to hypothesis tests. Calculate the probabilities of making type I and type II errors by direct evaluation of binomial or Poisson probabilities.	S2 Chapter 7.1, 7.3-7.4 Ex. 7B, pg. 149 Ex. 7C, pg. 153	2
Assessment – Hypothesis Testing I			

SAMPLING (3 lessons)

Topic	Syllabus	Text	Lessons
Sampling	Understand the distinction between a sample and a population and appreciate the benefits of randomness in choosing samples. Explain in simple terms why a given sampling method may be unsatisfactory and suggest possible improvements. Understanding the use of random numbers in producing random samples.	S2 Chapter 4.1-4.2 Misc. Ex. 4, Q1-4, pg. 101	1
	Recognise that a sample mean can be regarded as a random variable, and use the facts that $E[\bar{X}] = \mu$ and that $\text{Var}(\bar{X}) = \sigma^2/n$. Use the fact that \bar{X} is normal if X has a normal distribution. Use the central limit theorem where appropriate. Calculate unbiased estimates of the population mean and s.d.	S2 Chapter 4.3-4.7 Ex. 4A, pg. 87 Ex. 4B, pg. 90 Ex. 4C, pg. 100 Misc. Ex. 4, Q5-13, pg. 102	2
Assessment - Sampling			

CONTINUOUS RANDOM VARIABLES (3 lessons)

Topic	Syllabus	Text	Lessons
Continuous random variables	Understand the concept of a continuous random variable, and recall and use properties of a probability density function. Use a probability density function to solve problems involving probabilities, and to calculate the mean and variance of a distribution. Finding the location of, for example, the median by direct consideration of area.	S2 Chapter 1 Ex. 1A, pg. 9 Ex. 1B, pg. 13 Ex. 1C, Misc. Ex. 1, pg. 18	3
Assessment – Continuous random variables			

HYPOTHESIS TESTS FOR THE NORMAL DISTRIBUTION (6 lessons)

Topic	Syllabus	Text	Lessons
Hypothesis tests	Understand the nature of a test statistic. Formulate hypotheses and carry out a hypothesis test based on a sample drawn from a normal distribution of known variance OR a large sample using the central limit theorem and an unbiased variance estimate derived from the sample.	S2 Chapter 5 Ex. 5A, pg. 106 Ex. 5B, pg. 110 Ex. 5C, pg. 114 Ex. 5D, pg. 117 Ex. 5E, Misc. Ex. 5, pg. 120	4
Errors	Calculate the probabilities of making Type I and Type II errors in situations involving tests based on a normal distribution or approximation of a binomial or Poisson distribution.	S2 Chapter 7.2 Ex. 7A, pg. 143 Misc. Ex.7, pg. 155	2
Assessment – Hypothesis Testing II			

ASSESSMENTS

Students should complete an assessment test at the end of each unit of work. These assessments are completed in class. Marks for these assessments should be recorded on the sheets provided in the KS5 Assessment area as soon as they are complete.

Students must complete the student tracking record sheet following each assessment; the teacher should also have an updated copy of these in a folder for a record.

Exam past papers should be used for preparation for the examination in June.