Overview of YEAR 12 SPRING STATISTICS

Week	Statements	Teaching activities	Notes
1	2.02a Be able to interpret tables and diagrams for single-variable data. *e.g. vertical line charts, dot plots, bar charts, stem-and-leaf diagrams, box-and-whisker plots, cumulative frequency diagrams and histograms (with either equal or unequal class intervals). Includes non-standard representations.*		CHAPTER 16 WORKING WITH DATA SECTION 1 A REMINDER OF STATISTICAL DIAGRAMS Page 324-328 EXERCISE 16A Page 329-332

Week	Statements	Teaching activities	Notes
2	2.02f Be able to calculate and interpret measures of central tendency and variation, including mean, median, mode, percentile, quartile, inter-quartile range, standard deviation and variance. *Includes understanding that standard deviation is the root mean square deviation from the mean.*		SECTION 2 STANDARD DEVIATION Page 333-335 EXERCISE 16B Page 336-337

	Includes using the mean and standard deviation to compare distributions.		
	2.02g Be able to calculate mean and standard deviation from a list of data, from summary statistics or from a frequency distribution, using calculator statistical functions. *Includes understanding that, in the case of a grouped frequency distribution, the calculated mean and standard deviation are estimates.* *Learners should understand and be able to use the following formulae for standard deviation:* $\frac{\sqrt{\frac{\sum\left(x-\overline{x}\right)^2}{n}}}{\sqrt{\frac{\sum f\left(x-\overline{x}\right)^2}{\sum f}}} = \frac{\sqrt{\frac{\sum x^2}{n}-\overline{x^2},}}{\sqrt{\frac{\sum fx^2}{\sum f}-\overline{x^2}}}$ [*Formal estimation of population variance from a sample is excluded. Learners should be aware that there are different naming and symbol conventions for these measures and what the symbols on their calculator represent.*]		

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3	2.02g Be able to calculate mean and standard deviation from a list of data, from summary statistics or from a frequency distribution, using calculator statistical functions. *Includes understanding that, in the case of a grouped frequency distribution, the calculated mean and standard deviation are estimates.* *Learners should understand and be able to use the following formulae for standard deviation:* $\frac{\sqrt{\frac{\sum\left(x-\overline{x}\right)^2}{n}}}{\sqrt{\frac{\sum f\left(x-\overline{x}\right)^2}{\sum f}}} = \frac{\sqrt{\frac{\sum x^2}{n}-\overline{x^2},}}{\sqrt{\frac{\sum fx^2}{\sum f}-\overline{x^2}}}$ [*Formal estimation of population variance from a sample is excluded. Learners should be aware that there are different naming and symbol conventions for these measures and what the symbols on their calculator represent.*]		SECTION 3 CALCULATIONS FROM FREQUENCY TABLES Page 337-339 EXERCISE 16C Page 340-342

Week	Statements	Teaching activities	Notes
4	2.02c Be able to interpret scatter diagrams and regression lines for bivariate data, including recognition of scatter diagrams which include distinct sections of the population. *Learners may be asked to add to diagrams in order to interpret data, but not to draw complete scatter diagrams.* [*Calculation of equations of regression lines is excluded.*]		SECTION 4 SCATTER DIAGRAMS AND CORRELATION Page 343-345 EXERCISE 16D Page 345-348
	2.02d Be able to understand informal interpretation of correlation.		

Week	Statements	Teaching activities	Notes
5	2.02d Be able to understand informal interpretation of correlation.		SECTION 5 OUTLIERS AND CLEANING DATA Page 348-350 EXERCISE 16E Page 350-352 MIXED PRACTICE 16 Page 354-358

	2.02h Recognise and be able to interpret possible outliers in data sets and statistical diagrams.		
	2.02j Be able to clean data, including dealing with missing data, errors and outliers. *Learners should be familiar with definitions of outliers:* *1. more than 1.5 × (interquartile range) from the nearer quartile* *2. more than 2 × (standard deviation) away from the mean.*		

Week	Statements	Teaching activities	Notes
6	2.03b Be able to use appropriate diagrams to assist in the calculation of probabilities. *Includes tree diagrams, sample space diagrams, Venn diagrams.*		CHAPTER 17 PROBABILITY SECTION 1 COMBINING PROBABILITIES Page 360-363 EXERCISE 17A Page 364-365

Week	Statements	Teaching activities	Notes
7	2.04a Understand and be able to use simple, finite, discrete probability distributions, defined in the form of a table or a formula such as: $\mathrm{P}(X = x) = 0.05x(x + 1)$ for $x = 1, 2, 3$ [*Calculation of mean and variance of discrete random variables is excluded.*]		SECTION 2 PROBABILITY DISTRIBUTIONS Page 366-367 EXERCISE 17B Page 368-369

Week	Statements	Teaching activities	Notes
8	2.04b Understand and be able to use the binomial distribution as a model.		SECTION 3 THE BINOMIAL DISTRIBUTION Page 370-376

Week	Statements	Teaching activities	Notes
9	2.04c Be able to calculate probabilities using the binomial distribution, using appropriate calculator functions. *Includes understanding and being able to use the formula* $P(X = x) = \binom{n}{x} p^x (1 - p)^{n-x}$ *and the notation* $X \sim \mathrm{B}(n, p)$.		SECTION 3 Page 370-375 EXERCISE 17C Page 376-379

	Learners should understand the conditions for a random variable to have a binomial distribution, be able to identify which of the modelling conditions (assumptions) is/are relevant to a given scenario and be able to explain them in context. They should understand the distinction between conditions and assumptions.		

Week	Statements	Teaching activities	Notes
10			CHAPTER 17 MIXED PRACTICE 17 Page 381-383

Week	Statements	Teaching activities	Notes
11	2.01a Understand and be able to use the terms ‘population’ and ‘sample’.		CHAPTER 18 STATISTICAL HYPOTHESIS TESTING SECTION 1 POPULATIONS AND SAMPLES Page 385-391

	2.01b Be able to use samples to make informal inferences about the population.		
	2.01c Understand and be able to use sampling techniques, including simple random sampling and opportunity sampling. *When considering random samples, learners may assume that the population is large enough to sample without replacement unless told otherwise.*		

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12	2.01d Be able to select or critique sampling techniques in the context of solving a statistical problem, including understanding that different samples can lead to different conclusions about the population. *Learners should be familiar with (and be able to critique in context) the following sampling methods, but will not be required to carry them out:*		EXERCISE 18A Page 392-395

	systematic, stratified, cluster and quota sampling.		

Week	Statements	Teaching activities	Notes
13	2.05a Understand and be able to use the language of statistical hypothesis testing, developed through a binomial model: null hypothesis, alternative hypothesis, significance level, test statistic, 1-tail test, 2-tail test, critical value, critical region, acceptance region, *p*-value. *Hypotheses should be stated in terms of parameter values (where relevant) and the meanings of symbols should be stated. For example, "* $H_0: p = 0.7$, $H_1: p \neq 0.7$, *where* p *is the population proportion in favour of the resolution".* *Conclusions should be stated in such a way as to reflect the fact that they are not certain. For example, "There is evidence at the 5% level to reject* H_0*. It is likely that the mean mass is less than 500 g."* *"There is no evidence at the 2% level to reject* H_0*. There is no reason to suppose that the mean journey time has changed."*		SECTION 2 INTRODUCTION TO HYPOTHESIS TESTING Page 395-400

	Some examples of incorrect conclusion are as follows: *"H_0 is rejected. Waiting times have increased."* *"Accept H_0. Plants in this area have the same height as plants in other areas."*		

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14	2.05a Understand and be able to use the language of statistical hypothesis testing, developed through a binomial model: null hypothesis, alternative hypothesis, significance level, test statistic, 1-tail test, 2-tail test, critical value, critical region, acceptance region, *p*-value. *Hypotheses should be stated in terms of parameter values (where relevant) and the meanings of symbols should be stated. For example, "$H_0: p = 0.7$, $H_1: p \neq 0.7$, where p is the population proportion in favour of the resolution".* *Conclusions should be stated in such a way as to reflect the fact that they are not certain. For example, "There is evidence at the 5% level to reject H_0. It is likely that the mean mass is less*		SECTION 1 Page 395-400 EXERCISE 18B Page 400-402

	than 500 g." *"There is no evidence at the 2% level to reject H_0. There is no reason to suppose that the mean journey time has changed."* *Some examples of incorrect conclusion are as follows:* *"H_0 is rejected. Waiting times have increased."* *"Accept H_0. Plants in this area have the same height as plants in other areas."*		

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15	2.05a Understand and be able to use the language of statistical hypothesis testing, developed through a binomial model: null hypothesis, alternative hypothesis, significance level, test statistic, 1-tail test, 2-tail test, critical value, critical region, acceptance region, *p*-value. *Hypotheses should be stated in terms of parameter values (where relevant) and the meanings of symbols should be stated. For example, "$H_0: p = 0.7$, $H_1: p \neq 0.7$, where p is the population proportion in favour of the resolution".*		SECTION 3 CRITICAL REGION FOR A HYPOTHESIS TEST Page 403-406

	Conclusions should be stated in such a way as to reflect the fact that they are not certain. For example, "There is evidence at the 5% level to reject H_0. It is likely that the mean mass is less than 500 g." *"There is no evidence at the 2% level to reject H_0. There is no reason to suppose that the mean journey time has changed."* *Some examples of incorrect conclusion are as follows:* *"H_0 is rejected. Waiting times have increased."* *"Accept H_0. Plants in this area have the same height as plants in other areas."*		

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16	2.05a Understand and be able to use the language of statistical hypothesis testing, developed through a binomial model: null hypothesis, alternative hypothesis, significance level, test statistic, 1-tail test, 2-tail test, critical value, critical region, acceptance region, *p*-value. *Hypotheses should be stated in terms of parameter values (where relevant)*		EXERCISE 18C Page 406-400

	and the meanings of symbols should be stated. For example, " $H_0: p = 0.7$, $H_1: p \neq 0.7$, *where* p *is the population proportion in favour of the resolution".* *Conclusions should be stated in such a way as to reflect the fact that they are not certain. For example, "There is evidence at the 5% level to reject* H_0*. It is likely that the mean mass is less than 500 g."* *"There is no evidence at the 2% level to reject* H_0*. There is no reason to suppose that the mean journey time has changed."* *Some examples of incorrect conclusion are as follows:* *"*H_0 *is rejected. Waiting times have increased."* *"Accept* H_0*. Plants in this area have the same height as plants in other areas."*		

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17			MIXED PRACTICE 18 Page 409-410

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18			CROSS TOPIC REVIEW PAGE 416-419

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