A Level & Further Maths Topics by Exam Board - Statistics (11 pages; 30/6/21)

A Level

S: material common to AS and AL

S*: material for 2nd year of AL only

Further Maths

OCR

S: material common to AS and AL

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OCR B (MEI)

Statistics a [Sa] ('minor'; 1st half of 'major') [can be taken at either AS or AL]

Statistics b [Sb] (2nd half of 'major') [can be taken at either AS or AL]

AQA

S: material common to AS and AL

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Note: AQA specifications don't give any guidance, but there are useful notes for OCR, MEI & EDX, which can sometimes be referred to.

EDX

S1: material common to AS and AL

S1*: material for 2nd year of AL only

S2: material common to AS and AL

S2*: material for 2nd year of AL only

	fmng reference (Y⇒ note exists)	**OCR**	**OCR B (MEI)**	**AQA**	**Edx**
Averages ('measures of central tendency')				S	
mean		S	S		S
- estimated mean from grouped data		S			S
median		S	S		S
mode		S	S		S
mid-range			S		
Binomial distribution	Y	S,S	S ,Sa	S	S
- use of calculator		S	S	S?	S
- use of formula		S	S		
Hypothesis test for Binomial proportion		S	S	S	S
Confidence interval for population mean	Y				
- normal population; known variance		S*	Sb	S	S2*
- normal population; small sample; unknown variance (using t values)			Sb	S*	S2*
- large sample; known variance		S*	Sb		
- large sample; unknown variance		S*	Sb	S*	S2*

- difference in means for paired samples			Sb		
- difference between means from 2 normal populations; equal but unknown variances					S2*
Contingency Tables	Y	S	Sa	S	S1
Yates' correction		S		S*	
Goodness of Fit	Y	S, S*	Sa		S1
Continuous random variables					
pdf		S*	Sb	S	S2
Mean & variance		S*	Sb	S	S2
Formulae for mean & variance of linear comb'n of two variables		S*	Sb	S	
$E[g(X)]$		S*			
Var[g(X)]				S	
cdf		S*	Sb	S*	S2
median, quartiles, percentiles		S*	Sb	S	S2
cdf of related variables		S*			
skewness					S2
Correlation	Y				
Scatter diagrams		S	S ,Sa	S	S
Introduction to correlation		S,S*	S, S*	S	S

Introduction to rank correlation			S*		
Calculation of PMCC		S	Sa		S2
Hypothesis test using PMCC		S*,S	S*,Sa	S*	S*,S2
- using calculator to find r					S*
Calculation of Spearman's rank correl. coeff.		S	Sa		S2
Hypothesis test using Spearman's rank correl. coeff.		S	Sa		S2
Choosing between PMCC & Spearman's rank correl. coeff.		S	Sa		
Linear Regression	Y				
Calculation of regression line: random variable on non-random variable		S	Sa		S2
Residual sum of squares					S2
Calculation of regression line: random variable on random variable			Sa		
Data					
Table & diagrams:		S	S	S	S
- pie chart			S		
- vertical line charts		S	S		
- bar charts		S	S		
- dot plots		S	S		

- histograms		S	S	S	S
- freq. chart			S		
- frequency polygons					S
- stem & leaf diagrams		S	S		
- box & whisker plots		S	S		S
- cum. freq. diagrams		S	S		S
- skewness			S		
Discrete Random Variables					
Probability distributions		S,S	S ,Sa	S,S	S
Expectation & variance		S	Sa	S	S1
Linear coding (linear function of single variable)		S	Sa	S	
Formulae for mean & variance of linear comb'n of two variables			Sa		
$E[g(X)]$					S1
Estimators					
Unbiased estimates of population mean & variance		S*	Sb		S2*
Quality of estimators					S2*
Exponential		S*		S*	

Link between exponential & Poisson		S*		S*	
Geometric distribution	Y	S	Sa		S1*
Hypothesis test for parameter of Geometric distribution					S1*
Hypothesis tests	Y				
Type 1 & 2 errors: Poisson & Binomial				S	S1*
Size & power of test; power function				S*	S1*
Hypothesis test for population mean	Y				
Central Limit thm		S*	Sb		S1*
- normal population; known variance		S*,S*	S*,Sb	S*	S*
- difference between means from 2 normal populations; known variances					S2*
- difference between means from 2 normal populations; equal but unknown variances					S2*
- normal population; small sample; unknown variance (using t values)			Sb	S*	S2*
- paired t-test					S2*
- large sample; known variance		S*	Sb		
- large sample; unknown variance		S*	S*,Sb		S2*

Negative Binomial distribution					S1*
Non-parametric tests		S*			
Single sample Sign test		S*			
Paired sample Sign test		S*			
Single sample Wilcoxon Signed Rank test (for median)		S*	Sb		
Wilcoxon matched pairs Signed Rank test		S*			
Wilcoxon Ranked Sum (unpaired) test (aka Mann-Whitney U test)		S*			
Normal approximations using the Wilcoxon Signed Rank or Wilcoxon Ranked Sum tests		S*			
Normal distribution	Y	S*,S*	S*,Sb	S*	S*
Finding probabilities (using calculator)		S*	S*	S*	S*
Inverse Normal (using calculator)		S*			
Standard Normal transformation		S*			
Significance of point of inflexion		S*	S*	S*	S*
Approx. probabilities associated with $P(X > \mu + \sigma)$ etc		S*			
Normal approximation to Binomial (introduction)		S*	S*		S*

- using continuity correction					S*
Linear coding		S*	S*, Sb		
Appropriateness of Normal model			Sb		
Mean & variance of linear comb'n of two Normal variables		S*	Sb		S2*
Variance of Normal distribution					
Hypothesis test					S2*
Confidence interval					S2*
Test that samples are from Normal populations with the same variance					S2*
Poisson distribution	Y				
Conditions for Poisson		S	Sa	S	S1
Sum of independent Poisson variables		S	Sa	S	S1
Hypothesis test for mean of Poisson distribution				S	S1*
Poisson approximation to Binomial					S1
Probability		S	S	S	S
Mutually exclusive events		S	S	S	S
Independent events		S	S	S	S
Tree diagrams		S	S	S*	S
Sample space (aka 2-way) diagrams		S	S	S*	S*

Venn diagrams		S	S	S*	S
Conditional probability		S*	S*	S*	S*
Formula for union		S*	S*		S*
Permutations & combinations	Y	S			
Probability generating functions	Y				
Binomial, Poisson, Geometric, Negative Binomial					S1*
Use to find mean & variance					S1*
pgf of sum of RVs					S1*
Sampling	Y	S	S ,Sa	S	
Simple random sampling		S	S	S	S
Opportunity sampling		S	S	S	S
Systematic sampling		S	S		S
Stratified sampling		S	S		S
Cluster sampling		S	S		
Quota sampling		S	S		S
Self-selected samples			S		
Simulation of RVs			Sb		
Spread ('measures of variation')				S	

range			S		S
percentile		S	S		
quartile		S	S		
IQR		S	S		S
variance & std dev'n		S	S	S	S
- use of formulae (with denom. of n)		S			S
- use of formulae (with denom. of $n-1$)			S		
outliers		S	S	S	S
- $Q1-1.5\times IQR$ etc		S			
- mean $\pm 2\times sd$		S			
Uniform distribution					
Discrete		S	Sa	S	S
Continuous		S*		S*	S2