edexcel
advancing learning, changing lives

Examiners' Report / Principal Examiner Feedback

Summer 2010

GCE

Statistics S4 (6686)

Edexcel Limited. Registered in England and Wales No. 4496750
Registered Office: One90 High Holborn, London WC1V 7BH

A PEARSON COMPANY

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel's centres receive the support they need to help them deliver their education and training programmes to learners.

For further information, please call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our website at www.edexcel.com.

If you have any subject specific questions about the content of this Examiners' Report that require the help of a subject specialist, you may find our Ask The Expert email service helpful.

Ask The Expert can be accessed online at the following link:

http://www.edexcel.com/Aboutus/contact-us/

Summer 2010

Publications Code UA024770

Statistics Unit S4
Specification 6686

Introduction

Overall the paper worked well enabling nearly all candidates to demonstrate what they knew but also allowing the stronger candidates to show their true potential. Most students found Q1, Q2, Q3 and Q4 accessible with many scoring highly here.

Q5 and Q6 proved to be good discriminators and only the better candidates made significant progress through these. Generally candidates were able to carry out calculations but showed a lack of understanding when they had to use or interpret the answer to their calculations.

Report on individual questions

Question 1

This proved to be a good starter question and most candidates gave good solutions.

Part (a) was answered well with many candidates gaining full marks.

In part(b) although a pooled estimate was worked out correctly by many candidates they then failed to use the square root of it in their calculations of the confidence interval or they used $\sqrt{\frac{21.53}{15}}$ rather than $\sqrt{21.53\left(\frac{1}{8}+\frac{1}{7}\right)}$. A few candidates found the confidence intervals for the mean times separately rather than for the difference.

Question 2

In part (a) a minority of candidates realise that it is the "differences" which need to be normally distributed and not the distributions themselves.

In part (b) the most common error was an incorrect standard deviation. The majority of candidates were able to apply the method correctly and draw a conclusion in context.

Question 3

Many candidates were able to gain full marks in this question and even those who were unable to answer parts (a) to (c) gained several marks in the latter parts.

In part (b) a complete solution was often seen although several candidates wrote Power = 1 – P(0) – P(1) and then conclude that Power = $1- (1- p)^4(1 + 4p)$ with no steps in between. This does not gain full marks.

In part (d) several candidates used the power function given in part (b) rather than find the power for the deputy's test using the tables.

Question 4

The most able candidates gained full marks for this question. The most common error was in part (a) when they used $\frac{23.04}{\sqrt{15}}$ rather than $\sqrt{\frac{23.04}{15}}$.

Part (b) was well answered. The main error was to use 4.800 instead of 23.04.

In part (c) many candidates knew that they needed to use the highest values from parts (a) and (b) but then either did not square root the "57.3" or used $\sqrt{\frac{"57.3"}{15}}$ when finding z.

Question 5

The most able candidates gained full marks for this question. In part (b) a minority of candidates tested whether the variances of the two cars were equal rather than testing whether the variance of the Panther car was equal to 16.

Question 6

This question proved to be the most challenging question for many candidates. Few candidates wrote down the distributions of X_1, X_2 and X_3 in part (a) and those who tried were unable to do so accurately. The Normal and Binomial distributions were commonly seen. This aside candidates were then able to progress and gain at least two marks in part (a).

In part (b) the main error was not to use their means from part (a). Even the candidates who correctly identified the Poison introduced a variety of variances including σ^2.

In part (c) and (d) the candidates who knew E($\bar{Y}$) = μ and Var ($\bar{Y}$) = $\frac{\sigma^2}{n}$ gained full marks.

In part (e) the majority of candidates used Var$\left(\frac{1}{4}\bar{Y}\right)$ < Var ($\hat{\lambda}$) although it was not always clear from their working that this was the case with many writing Var$\left(\frac{1}{4}\bar{Y}\right)$ = Var ($\hat{\lambda}$) and simply solving the equation.

Grade Boundary Statistics

The table below give the lowest raw marks for the award of the stated uniform marks (UMS).

Module		Grade	A*	A	B	C	D	E
		Uniform marks	90	80	70	60	50	40
AS	6663 Core Mathematics C1			59	52	45	38	31
AS	6664 Core Mathematics C2			62	54	46	38	30
AS	6667 Further Pure Mathematics FP1			62	55	48	41	34
AS	6677 Mechanics M1			61	53	45	37	29
AS	6683 Statistics S1			55	48	41	35	29
AS	6689 Decision Maths D1			61	55	49	43	38
A2	6665 Core Mathematics C3		68	62	55	48	41	34
A2	6666 Core Mathematics C4		67	60	52	44	37	30
A2	6668 Further Pure Mathematics FP2		67	60	53	46	39	33
A2	6669 Further Pure Mathematics FP3		68	62	55	48	41	34
A2	6678 Mechanics M2		68	61	54	47	40	34
A2	6679 Mechanics M3		69	63	56	50	44	38
A2	6680 Mechanics M4		67	60	52	44	36	29
A2	6681 Mechanics M5		60	52	44	37	30	23
A2	6684 Statistics S2		68	62	54	46	38	31
A2	6691 Statistics S3		68	62	53	44	36	28
A2	6686 Statistics S4		68	62	54	46	38	30
A2	6690 Decision Maths D2		68	61	52	44	36	28

Grade A*

Grade A* is awarded at A level, but not AS to candidates cashing in from this Summer.

- For candidates cashing in for GCE Mathematics (9371), grade A* will be awarded to candidates who obtain an A grade overall (480 UMS or more) *and* 180 UMS or more on the total of their C3 (6665) and C4 (6666) units.
- For candidates cashing in for GCE Further Mathematics (9372), grade A* will be awarded to candidates who obtain an A grade overall (480 UMS or more) *and* 270 UMS or more on the total of their best three A2 units.
- For candidates cashing in for GCE Pure Mathematics (9373), grade A* will be awarded to candidates who obtain an A grade overall (480 UMS or more) *and* 270 UMS or more on the total of their A2 units.
- For candidates cashing in for GCE Further Mathematics (Additional) (9374), grade A* will be awarded to candidates who obtain an A grade overall (480 UMS or more) *and* 270 UMS or more on the total of their best three A2 units.

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467
Fax 01623 450481

Email publications@linneydirect.com

Order Code UA024770 Summer 2010

For more information on Edexcel qualifications, please visit www.edexcel.com/quals

Edexcel Limited. Registered in England and Wales no.4496750
Registered Office: One90 High Holborn, London, WC1V 7BH