Version

Free-Standing Mathematics Qualification
June 2012

Mathematics Advanced Level 6991

(Specification 6991)

Working with Algebraic and Graphical Techniques

Report on the Examination

Further copies of this Report on the Examination are available from: aqa.org.uk

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales (company number 3644723) and a registered charity (registered charity number 1073334).
Registered address: AQA, Devas Street, Manchester M15 6EX.

FSMQ Advanced level – Written paper

General

The graphical questions were well answered in comparison with the algebraic questions. Many did not work to 3 significant figures and often truncated their answers which cost them marks. Too many gambled on using trial and improvement to solve equations and often scored no marks as their answers were not accurate enough. Often the explanations did not link the model with the data.

Question 1

Parts (a), (b) and (c) were well answered. A rare error was to plot the points but not the curve through them. Most only gave one answer to part (c), usually the lower x value. Many wrote down $b = 90$ in part (d)(i) but only a few got $a = 8100$ and $a = -8100$ was more common. Part (d)(ii) was very poorly answered with many stating that it gave the coordinates of the maximum point and not relating a and b to the dimensions of the longbow. Some gave $y = x(110 - x)$ in part (e) but then divided by 270 or 250 or 150.

Question 2

A few truncated their values to 1.18 and 0.75 in part (a)(i). Many found it difficult to plot the points accurately in part(a)(ii), but their lines of best fit were correct on follow through. Most gave the value of C as 2.48 and the value of k as negative.

In part (b)(i) a common error was $24^{-\frac{3}{8}}$ which then became 23.625. In part (b)(ii) common errors were $5 = 24^{-\frac{t}{8}}$ or $-7 = 2^{-\frac{t}{8}}$ and $\ln 5 = \ln 12 + \ln 2 - t/8$. Those who did trial and improvement often only gave 10 and not 10.1 as the answer.

Question 3

Most scored well in parts (a) to (e). Rare errors were $t = 7$ in part (b) and $t = 1$ in part (d). In part (e) many gave all the months when A was greater than 300 or just one month, usually April. Many added units for part (f) so the amplitude was often given as 245 tonnes and the period was 12 months or 1 year. In part (g) many took the modal value for June as 410 or divided by 388 instead of 400. Parts (h) and (i) were very poorly done with many still using words such as “squash”, “compress” or “move up”. Most used a scale factor of -30 or 30 instead of $1/30$ in part (i).

Question 4

Most could set up the correct equation in part (a) with the usual error then being $220^2/20$ or $20/220^2$. In part (b) most drew a tangent rather than a chord but many gave a positive gradient as their answer. The usual errors in part (c) were answers of drag/m/s or just m/s.

Question 5

Most scored well in parts (a) and (b) with the usual errors being to start both graphs at $v = 20$, or to plot the end points but not to join them up with a smooth curve. A few insisted that both curves started at the origin. Some gave 160 as the answer in part (c)(i) or 1.6 as the value of P or D. Many made some progress in part (c)(ii) and often got the common drag value of 16 but then could not obtain the equation.

FSMQ Advanced level – Portfolios

The standard of portfolios submitted for this award was generally very credit worthy with most centres following the Specification carefully. Working with Algebraic and Graphical Techniques was the most popular unit followed by Using and Applying Statistics and Using and Applying Decision Mathematics.

Generally centres encouraged their candidates to produce portfolios which showed independent work and realised for a high mark in Strand One initiative must be demonstrated in the development of the investigation. Some centres, however, did not appreciate that if a portfolio is incomplete scaling of marks must take place as indicated in the Specification.

It was pleasing to see that most centres encouraged their candidates to validate their work by carrying out a thorough range of 'checks'. However, the candidates from some centres did not produce work of the correct standard, this was particularly apparent in the Statistics unit where often only core material was developed. Some candidates did not produce "A report of fitting a function to non-linear data by plotting a linear function" for the Algebra unit and so could only be awarded a maximum mark of 24.

There were some very exciting portfolios which were rightly awarded a high mark, the assignments had been developed independently and the conclusions had included an explanation of how the initial data affected the findings. It should be remembered, however, that for a high mark in the Statistics unit, work on tests of significance, Mann Whitney test, Wilcoxon signed rank or similar topics must be seen. Similarly, in the Calculus unit integration/differentiation of more advanced functions must be attempted if a high mark is to be awarded.

The provision of samples was very efficient and most centres provided detailed comments on the Candidate Record Forms which greatly assisted the moderation process.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics pages of the AQA Website.

UMS conversion calculator www.aqa.org.uk/umsconversion.