AQA

Free-Standing Mathematics Qualification

Working with Algebraic and Graphical Techniques 6991
Advanced level

Report on the Examination
2010 examination – June series

Working with Algebraic and Graphical Techniques (6991) Examination

General

This paper was accessible to candidates with many showing that they were well prepared and had sufficient time to complete the paper. The new style of question and answer booklet ensured that candidates' presentation was good and that their work was better spaced out than in previous years. The graphical questions were well answered in comparison with the algebraic questions, but a few candidates did just plot the points and then failed to join up the points, or drew a curve that was more than half a square out from their plotted points. Many did not work to 3 significant figures and often truncated their answers. The descriptions of geometrical transformations were better this year. Many of the explanations did not link the model with the data.

Question 1

In part (a), some candidates commented that after 30 the values were unrealistic. This was true but was not a mathematical interpretation.

Part (b) was usually correct but some candidates plotted less than 7 points or missed out (0,0).

Part (c) was rarely wrong, but q = 75 was common in part (d), and if q was correct a common answer for p was 225.

The interpretations in part (e) were often reversed. Sometimes it was unclear which answer was p and which was q.

Part (f) was poorly done with many candidates putting c = 0 rather than 800 in the quadratic formula. Others read values from their graph.

Question 2

Most candidates got part (a) correct, but some made arithmetical errors when substituting values into the equation and answers such as 260, 340 and 370 were common.

In part (b) many assumed the answer was just past 40 and so answers of 41 or 42 were common with no working.

In part (c) many candidates only worked to 3 significant figures and gave an answer of 4.16% rather than working with more than 3 significant figures to ensure that their final answer was accurate to 3 significant figures.

Common answers to part (d) were 395, 398 and 399.99.

Question 3

This question was very poorly answered with many scoring 0 marks.

In part (a) many tried to rearrange the algebra with expressions such as $N = a + b\sqrt{40}$ with no value for *N*. Some scored one mark for $395 = a + b\sqrt{40}$.

In part (b) some candidates scored a mark for substituting their values in $a + b\sqrt{30}$.

Many stated that the value of *N* got smaller as *t* got bigger in part (c).

Question 4

Many candidates scored well on this question. Most attempted to plot the correct values in part (a) but some did not plot 7 values.

Most candidates got part (b) correct. In part (c), many gave 1950 or t = 100, both of which scored one mark.

In part (d), many candidates gave the stretch in the R axis correctly, but usually gave the

t stretch as having a scale factor of $\dfrac{90}{50}$ for no marks, or a t stretch of $\dfrac{1}{90}$ for one mark followed

by a t stretch of $\dfrac{1}{50}$ for no marks.

Question 5

In part (a) many candidates had explanations involving $\ln k \times \ln(t^c)$.

Part (b) was usually correct but some candidates worked to 4 significant figures and so lost a mark.

Many candidates had difficulty plotting the points but their lines of best fit were correct in part (c).

Many candidates gave the correct vertical intercept in part (d) but few scored 3 marks and most had a positive gradient. Many gave answers such as $y = -0.8x + 7.1$ for 2 marks.

Part (e) was usually ignored and rarely correct with many candidates assuming they had already answered it by doing part (d).

Many candidates stated that the data was linear between 1930 and 1955 in part (f)(i). More candidates scored in part (f)(ii). Most commented on the increasing attendance after 1985, but some stated 'positive correlation' instead of 'positive gradient'.

Many candidates failed to draw a tangent in part (g)(i) and just used values from the curve and so scored no marks. The common error in part (g)(ii) was to give an answer of 'cinema admissions per year'. Most candidates interpreted part (g)(iii) correctly but a few stated that it gave the number of cinema admissions in 1943.

Portfolio
FSMQ Advanced Level – June 2010

It was pleasing to see a great deal of variety in the portfolios produced for the Advanced level FSMQ. In the spirit of FSMQ many centres encouraged candidates to obtain data or develop projects from other areas of study. It should be noted that a high mark in Strand One cannot be achieved by candidates unless independence in the true sense of the word is demonstrated, not just carrying out a given project without advice.

Most centres submitting **'Working with Algebraic and Graphical Techniques'** portfolios ensured that candidates produced a report on fitting a function to non-linear data by plotting a linear function. This is an essential requirement and candidates not including this work can only achieve a maximum mark of 24. There should also be a demonstration of algebraic manipulation and techniques and if this is not present the maximum mark would be 35.

There were some interesting portfolios produced for **'Using and Applying Statistics'** with examples from biology and geography. For a mark of 40 or over candidates must include high level work on such statistical topics as Mann-Whitney, t-test, Chi-squared or Wilcoxon signed rank test etc.

Portfolios produced for **'Using and Applying Decision Mathematics'** developed a range of projects, from wedding planning to a dinner party. Candidates can often relate their analysis to 'real life' by carrying out the tasks described and finding if there are any hidden pit falls not realised during the design.

The vast majority of candidates demonstrated the need to check their work, especially in the Algebra portfolios; although some candidates did not actually state that they were "checking".

Candidates did summarise their work and in many cases looked at their initial assumptions and how they affected the outcomes.

It was very pleasing to see excellent internal moderation from centres and also the detailed comments on the Candidate Record Forms. Please continue to provide these as they greatly assist in moderation.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA Website.