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ASSESSMENT and QUALIFICATIONS ALLIANCE

Free–Standing Mathematics Qualifications
AS Use of Mathematics

Report on the Examination

2006 examination – June series

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General

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It is also a requirement of QCA's code of practice that annotation is used to identify those parts of the portfolio particularly worthy of credit, in order to justify the mark awarded. This annotation may be on the portfolio itself or on the candidate record form. Occasionally, portfolios are supplied with neither portfolio annotation nor adequate comment on the candidate record forms. This is contrary to the code of practice.

This year QCA has targeted plagiarism; hence moderators were required to check that all candidate record forms were signed by the students. Fortunately, it was necessary in relatively few cases to require centres to supply additional candidate record forms, this time signed by the candidates. It was a requirement of QCA that, this year, any portfolio with an unsigned record form should be awarded zero marks.

The majority of centres supplied very good portfolios but a few centres included portfolios which were somewhat disappointing, often significantly incomplete. Portfolios which are incomplete need to be scaled down. The new 2007 specification lists the necessary scaling for each unit.

Also in the 2007 specification are details of any topics which are required to obtain specific grades.
For example, in Managing Money, marks over forty cannot be given to portfolios which do not contain work on fractions (which is not just finding a percentage by means of a fraction, such as using $\frac{22}{100} \times £74$ to find 22%). The requirements for the use of spreadsheets in different units are also specified. Centres should check both the 2007 specification and the FSMQ Teachers' Guide during the next year as some revisions will come into effect. These are available both on the AQA website and from AQA in paper form.

One problem which still arises in the portfolios is in theme 2, Using Appropriate Mathematics and Working Accurately. It was noticeable that candidates continue to attempt to show more explicit checking. However, candidates still find difficulty in demonstrating clearly where checking has taken place; without clear evidence of checking, the maximum mark available in theme 2 is 8.

The paper work this session was often completed correctly. The administrative arrangements regarding centre mark sheets caused minor difficulties; one or two centres sent only one copy to the moderator.

In conclusion, the main problem areas in the portfolios were:

1. incomplete portfolios which were not scaled accordingly;

2. portfolios which were given high marks in strand 2 without evidence of adequate checking;

3. portfolios, which were inappropriately given marks over forty. Portfolios worthy of a grade A, that is those with forty or more marks, must show genuinely very good quality of work and not simply be better than most of the class's work.

Examinations

Managing Money (6981/2)

Foundation

General

Most candidates entered for this paper were well prepared, with many achieving creditable marks. There were few scripts with very low totals. Candidates often failed to answer the questions fully; for example, in questions 1 part (c) and 3, the discounts were given rather than the amounts paid and, in question 6, the number of black chess pieces was often used rather than the number of pieces which were not black.

The topics which candidates found most difficult included:

- Fractions, question 6 part (a);
- Ratio, question 7;
- Estimations, question 9;
- Compound interest, question 10.

Question 1

Part (a) of this question was completed well. In part (b), the question asked for the number of plants, 48, whereas candidates often gave the answer 4, the number of trays of bedding plants, as their answer. Most candidates were successful in part (c), but a minority who found $\frac{1}{3}$ to be £8 forgot to subtract this from £24, the original price.

Question 2

This question was answered well.

Question 3

A few candidates could not cope with percentages and performed a subtraction, for example £24.80 – £0.40 = £24.40. Most candidates found 40% of £24.80 to be £9.92, but a substantial proportion did not subtract this amount from £24.80.

Question 4

Both parts were answered well by those candidates who understood what was required. A few correctly rounded the pounds, but left the 92p, writing £580.92 for example in part (b). Although £600 and £580 were the correct answers, a few gave £600.00 and £580.00, which were accepted.

Question 5

This question was well done. Occasionally, candidates wrote an incorrect code or an incorrect product in the 4th row, usually ordering one of each item including one 'Super snakes and ladders'; some made an addition error in their totals. A few candidates ordered one quoits set three times; as this gave the correct answer, it was condoned. Most candidates found the appropriate packaging costs and the correct total.

Question 6

The majority of candidates found 12, the number of non black pieces. The creation of a fraction $\frac{12}{20}$ (or even $\frac{8}{20}$) caused major problems. Few simplified $\frac{12}{20}$ to $\frac{3}{5}$ [or $\frac{8}{20}$ to $\frac{2}{5}$]. Those who did obtain either of these converted their answer to 60% (or 40%) with no problem.

Question 7

This question was answered correctly by relatively few candidates, with a significant proportion not finding 5 as the total number of parts. Those candidates who did not find the total number of parts usually gave the answer as 4.

Question 8

In part (a), most candidates completed column D correctly. However, column E was seldom completed correctly. Few attempted to convert the saving into a percentage. Those who did rarely tried to find the saving as a percentage of the High Street price, as required. Virtually all candidates who found column E correctly gave the correct formula in part (b).

Question 9

Few candidates attempted to use approximations as required. Often the two amounts £393.3 (million) and 59.9 (million) were divided and the resulting 6.5659 was then rounded to £6.50, £7 or £6.57 or truncated to £6.56. This method was given no credit.
A few who did obtain 400 (million) and 60 (billion) divided 60 by 400, rather than 400 by 60, or gave their answer as £6.50 million.

Question 10

A significant proportion of candidates completed this question correctly but the truncation of the interest found, to £6.21 and £6.23, often gave a final answer of £2018.64 rather than £2018.66 as required. Only a few candidates used values of £6.20, or even £12.40 and £18.60, for the interest amounts.

Working in 2 and 3 Dimensions (6982)

Foundation

General

The majority of the candidates worked through all of the questions on the paper, with some candidates achieving very high marks and some very low marks. The scores of the candidates from most centres were distributed across the range, but there were some centres where all the candidates scored less than half marks. In some cases, candidates did not appear to have a ruler or calculator and this obviously made it very difficult for them to succeed.

Question 1

Most of the candidates scored highly on this question. However, there were some candidates who thought the Legs of Man had three lines of symmetry and that the Millennium Stone had eight. Also an incorrect name, usually hexagon, was occasionally given in part (c) instead of octagon.

Question 2

Very few of the candidates achieved high marks for this question.

In part (a) candidates often used the formula for the area of a circle instead of its circumference. Occasionally those who did use a correct formula for the circumference then confused the radius and diameter and hence got the wrong answer. A large proportion of the candidates failed to round their answer to the nearest metre and consequently lost the final mark in part (a).

In part (b) very few candidates used the scale correctly. The most common error was to multiply, rather than divide by 50 and candidates who did this sometimes gave the answer 110 000 cm even though this was ridiculously high for a model. Others multiplied by 50 and then divided by 100, rather than multiplying by 100, to convert from metres to centimetres. Although this gave what appeared to be a sensible answer (11 centimetres), by doing this they lost all the marks for this part. It was very disappointing that some of those candidates who correctly divided by the scale factor sometimes could not carry out the conversion.

Question 3

Part (a) of this question was not answered well on the whole. Although many candidates did split the shape into a triangle and rectangle, a large proportion of them did not calculate the area of the triangle correctly. Some candidates could not find the height of the triangle and those who found the height correctly often just multiplied it by the base. A number of candidates seemed to have no idea what to do and just added or multiplied all the lengths given on the diagram.

The quality of the diagrams produced for part (b) varied from centre to centre. Some diagrams were excellent and gained full marks, but there were also some extremely poor attempts. Candidates from some centres did not make any attempt to use the given scale and a few of these candidates did not even use a ruler to draw the straight lines.

Question 4

In part (a) the angle was read wrongly as 60° more often than correctly as 120°.

Some candidates achieved all the marks for part (b), but a significant number of candidates had difficulty in coping with measurements given in millimetres. Often candidates realised that the sides *AD* and *BC* were both equal to *AB* and used a correct method for calculating the perimeter, but then were unable to convert the units correctly to metres.

Part (c) of the question was answered correctly by most of the candidates.

Question 5

Most of the candidates were awarded the first mark for drawing an accurate circle, but many did not know the method for constructing an equilateral triangle using only pencil, ruler and compasses.

Question 6

Part (a) was answered reasonably well and a large proportion of the candidates were awarded full marks for correctly calculating the volume of the cuboid. Some of the remaining candidates lost a mark by giving incorrect units and a few added the three lengths rather than multiplying them to find the volume.

Finding the volume of the cylinder in part (b) proved to be much more difficult for the majority of the candidates. Only a small proportion of them correctly found the area of the cross section and then multiplied by the height. In many of the incorrect attempts candidates simply multiplied the radius or diameter of the cylinder by its height.

Many of the candidates used the correct method in part (c), though they often lost the second mark by not rounding their answer sensibly. Unfortunately, some of those candidates who had found an incorrect value in part (a) or (b) sometimes changed the correct method for an incorrect one when they did not get a sensible result, and as a result did not achieve any marks for this part.

Making Sense of Data (6983)

Foundation

General

The majority of candidates were well prepared for this paper. Overall, many very good scripts were submitted and pleasing standards were achieved. Candidates scored well on questions one and three. Presentation and working were generally quite good, usually with appropriate methods which the marker could follow. However, a number of candidates apparently did not possess a protractor and drew the pie chart in question 2 freehand.

Questions found difficult were:

- Explanations- question 1, part (g), question 7 part (d);
- Percentages- question 4 part (b), question 7, part (a);
- Fractions- question 4, part (a);
- Ratio- question 5;
- Pictograms- question 7 part (e).

Question 1

This question was answered well by virtually all candidates. Parts (a), (b), (c) and (f) were usually all answered correctly. If any errors did occur, these were in parts (d) and (e), where the median and the mean were interpreted in reverse order. Part (g) caused candidates problems; most just quoted how the mean and median were found.

Question 2

This question was a good source of marks for the majority of candidates who were able to calculate the correct sector angles for the pie chart. Unfortunately a minority did not have access to a protractor and others were unable to measure and label the pie chart sectors correctly.

Question 3

Many correct bar charts were seen in this question. However marks were lost when candidates failed to label their bars correctly, failed to use a linear scale for the vertical axis, or failed to start their axis at zero. Others plotted ten bars rather than the five required.

Question 4

Relatively few candidates could convert 5% into a fraction and, of those who did, it was rare to see anyone simplify the correct fraction from $\frac{5}{100}$ to $\frac{1}{20}$. In part (b), only a few candidates attempted to calculate $\frac{9}{100} \times 1200$.

Question 5

It was common to see 40 ÷ 4 rather than 40 ÷ 5; few candidates showed that they realised that to divide in the ratio 1 : 4, five parts were required.

Question 6

Most candidates completed columns C and D correctly. A small proportion found that the saving in price required in column E needed more care than usual, as they too easily lost their units, with E4, 36p, and E5, £35, and with E6 being written incorrectly as £53.4 rather than £53.40. Candidates sometimes gave a negative saving in E7 rather than zero. In part (b), most candidates found the saving in the camera correctly as £35, but could not convert it into a percentage of £280.

Question 7

Part (a) caused candidates problems in converting 12 out of 30 into a percentage. The tally chart in part (b) was completed correctly by the majority of candidates. Most were able to give a satisfactory explanation for the method used to check the recording of the total number of responses in part (c). Few gave a sensible reason in part (d). In part (e), the pictogram was answered well. A few decided to use a different symbol for each number of bands and, more commonly, the symbol for 5 people was different from the symbol used for ten people rather than candidates using half the symbol of that which they used for ten.

Coursework Portfolios

Intermediate Level

General

It was pleasing to note that most of the centres who entered candidates at this level this session assessed their work within approved tolerances.

The majority of candidates produced creditable portfolios, with only a minority appearing to find the coursework challenging. A few centres produced very impressive portfolios. These included a number of portfolios which were clearly written principally for their other studies; this cross-curricular work usually stimulated candidates to produce interesting portfolios of their best standard.

However, it was noticeable that centres differed widely on the amount of annotation which they gave to their work. Annotating the work is helpful to candidates as it provides them with feedback and this feedback can often identify which parts of the criteria they need to include within the next part of their portfolio.

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The majority of centres supplied very good portfolios but a few centres included portfolios which were somewhat disappointing, often significantly incomplete. Portfolios which are incomplete need to be scaled down. The new 2007 specification lists the necessary scaling for each unit. Also in the 2007 specification are details of any topics which are required to obtain specific grades.

Centres should check both the 2007 specification and the FSMQ Teachers' Guide during the next year as some revisions will come into effect. These documents are available both on the AQA website and from AQA in paper form. For example, in Handling and Interpreting Data, marks of over thirty-five can only be given to portfolios where a significant proportion of the work demonstrates those techniques included only in the intermediate level data handling unit. Portfolios which contain virtually no post foundation unit work should not be awarded marks over a bare pass, i.e. 10 marks (see the Teachers Guide page 11).

The portfolios completed this year for the unit 'Calculating Finances' showed a greater involvement with the topics at intermediate level than was seen in the 'Handling and Interpreting Data' portfolios, although this was largely a result of the more prescriptive nature of the requirements. Those who studied 6985 Solving Problems in Shape and Space and 6988 Using Algebra, Functions and Graphs often produced work of a good quality.

Centres carried out their administration well. When centres entered candidates for two or more intermediate units, it was common to receive separate centre declaration sheet for each unit. However, only one centre declaration sheet is required covering **all** the intermediate level units, confirming that each of the intermediate units has been assessed at the same standard.

To conclude, the main problem areas in the portfolios were:

1. portfolios which did not contain enough post-foundation unit material for the mark awarded;

2. incomplete portfolios which were not scaled accordingly;

3. portfolios which were given high marks in strand 2 without evidence of adequate checking;

4. portfolios, which were inappropriately given marks over forty. Portfolios worthy of a grade A, that is those with forty or more marks, must show genuinely very good quality of work and not simply be better than most of the class's work.

Examinations

Calculating Finances (6984/2)

Intermediate level

General

This paper was found to be of a suitable length with all candidates completing the paper. Most candidates were prepared for the earlier part of this paper but found the last few questions challenging. However, a significant minority of candidates struggled with all parts of this paper, including dividing £50 in the ratio of 4:1. These candidates achieved a very disappointing total, and would clearly have gained more benefit from following the foundation level course, Managing Money.

Question 1

Candidates divided the greater number by the smaller number to obtain the average amount spent per transaction. Thus, for 1999, they divided 18 by 1.5, ignoring the fact that 1.5 billion is larger than 18 million. Others multiplied the two numbers given and ignored the fact that real life data should give realistic results. The formula in part (b) was often incorrect and, unsurprisingly, candidates often saw no sensible conclusion in part (c).

Question 2

A significant proportion of candidates did not find the total cost, £294, and hence were unable to express £84 as a fraction of the total cost. Those who did find £294 often could not simplify $\frac{84}{294}$ to $\frac{2}{7}$.

Question 3

This question was answered well by most candidates, but it was disappointing on an intermediate level paper to see so many candidates unable to divide £50 in the ratio of 4:1.

Question 4

Part (a) was answered well, although a few candidates attempted to do a calculation with the interest rate of 5%. Most candidates were successful in part (b), with many also succeeding in part (c). In part (d), few candidates found the new repayment rate and hence the increase in repayments. Very few candidates appreciated that the repayments paid off the mortgage debt as well as paying the interest charge.

Question 5

Most candidates found the annual income in part (a) and subtracted the tax-free allowance of £4895. Most candidates attempted to find the amount of income taxed at 22p in the pound and at 40p in the pound; but those who did sometimes subtracted £209, the tax paid at 10%, rather than £2090, being the income taxed at 10%. The amount taxed at 40% was often not found correctly.

Question 6

This question was answered badly, with few candidates showing that they were able to master the amount subject to National Insurance at 11%. Only the better candidates subtracted £94, the amount not subject to National Insurance, before finding 11%. The common answer was £34.10, being 11% of £310. Only a few used the contracted out rate of 9.4%, while others tried to use monthly payments.

Question 7

This question was well answered. A few stated the year as 1994, as this gave the largest percentage of economic growth, rather than 1992 - 1994, which was the period of greatest increase.

Question 8

Most candidates simply found 10.9% of £283.4 million. Only the better candidates stated that 283.4 million was equivalent to 89.1% of the amount sold in 2002.

Question 9

This question was found challenging. Candidates normally just subtracted 25% from the 80% quoted in the question. A few candidates attempted to find 25% of 180% but did not appreciate what to do with the 45 they found. Better candidates quickly obtained the correct answer of 35%

Question 10

The 6n was a major concern to candidates. 6n was occasionally used as $6 \times n$ but many candidates wrote down 6 1 and hence used 61. Thus, many candidates used $P = 5000 \times 1.005^{61}$. A few correctly obtained £5151.89, but often their answers were 1p or 2p out. A considerable proportion used simple interest to obtain an AER of 3%.

Solving Problems in Shape and Space (6985)

Intermediate

General

There were very few candidates for this examination and this qualification will not be available in 2007. The demands of the examination were, in general, beyond the candidates and none of them achieved more than half marks. Some candidates were able to make a reasonable attempt at a few of the questions, but these varied from centre to centre and no candidates were able to demonstrate skills across the full range of topics. The foundation level qualification, Working in 2 and 3 Dimensions, would have been much more appropriate for them.

Question 1

Most of the candidates were able to answer part (a) but a significant proportion of them did not know how to start part (b). All of those candidates who did start part (b) by finding the area of one or both circles then failed to complete the question, either by not subtracting to find the area of the annulus or by not dividing by eight to find the area of one of the congruent sections.

Question 2

Most of the candidates were able to gain two marks in part (a) by correctly identifying two different types of transformation that would map rhombus *Y* onto rhombus *Z*, but most did not give the details required to achieve the other two marks.
In part (b), most of the candidates managed to draw the circle but many did not know how to construct an equilateral triangle in it.

Question 3

In part (a), the majority of the candidates got the mark for naming the kite.
In part (b)(i), very few candidates were able to explain why angle *CDE* must be 22.5°.
Part (b)(ii) also proved to be beyond most of the candidates, and the few who did use tangent were unable to use it correctly to find the length of *EC* and hence the diagonal of the kite. Part (b)(iii) was also answered very poorly, with only a small proportion of the candidates achieving any of the available marks for finding the area of the kite.

Question 4

In part (a)(i), only a few of the candidates realised that they could use Pythagoras to find the height of equilateral triangle *ADE* and even fewer attempted to use trigonometry.

Although follow through marks were available for the later parts of the question, many of the candidates did not attempt these. Those candidates who did continue with the rest of the question achieved very few of the marks available for finding the area of the trapezium and the volume of the triangular prism. A significant proportion of the candidates just added or multiplied the lengths given on the diagram. No-one was able to convert cubic centimetres to cubic metres and most of the candidates who attempted this just divided by 100 or 1000!

Question 5

Those candidates who took care with their diagrams were able to gain all three marks for part (a). A few candidates were also able to find and simplify the ratio of the heights of the trophies, but no-one correctly found the volume ratio by using the cube of the height ratio.

Question 6

Just a few candidates started this question by substituting the value for the volume of the sphere into the formula. Unfortunately they were usually unable to transpose the formula to find the radius.

Question 7

The majority of the candidates calculated angle *ARB* correctly, but no-one realised that part (b) required the use of the Sine Rule. A few candidates treated the triangle as if it were right-angled and the others did not attempt this part.

Handling and Interpreting Data (6986/2)

Intermediate

General

Most candidates attempted all the questions, although it was noticeable that students from some centres had difficulty with certain topics. It was pleasing to note that a large proportion of the entry was well prepared for the paper and made good progress. It was noticeable that most candidates were able to give some sensible comments in question 6. It was rare to find candidates unable to answer at least one or two of the first five questions. However, it was also rare to find candidates able to answer well **all** of these questions. Many candidates achieved creditable marks. Disappointingly, some candidates did not have a protractor to measure the angle in question 3, and a few candidates had neither a protractor nor a calculator.

Question 1

Most candidates calculated both means in parts (a)(i) and (ii) correctly. A few candidates added the length and seating capacities but failed to divide these by five and made no further progress. In part (b), most candidates used suitable scales and plotted the points correctly. In a small number of cases the scale used did not allow their mean point to be plotted and some used non-linear scales. An acceptable line of best fit was drawn in most cases in part (c), although many candidates failed to plot the double mean accurately. In part (d) a few candidates did not try to use their line of best fit to obtain the seating capacity for the plane of length 48.5 metres. Candidates who indicated a correct method sometimes misread the scale on the vertical axis, choosing to give an approximate answer.

Question 2

The cumulative frequencies were usually found correctly; only a few addition errors were seen. In part (a), a common error was in plotting points at the mid values. When the cumulative frequency graph had been drawn, part (b) was usually answered correctly. A few candidates gave the median as 20 with the quartiles at 10 and 30. In part (c) nearly every candidate showed a box which started at zero.

Question 3

In part (a), the angle in the pie chart for France was usually measured to an acceptable degree of accuracy (± 2 degrees). Candidates who attempted to calculate the correct fraction of 38.7 million often ignored the millions in their calculation and failed to appreciate this value in their final answer.
In part (b), a significant number of candidates appeared to have a vague understanding of comparative pie charts and those who measured the radii often did not square the ratio of 3. The calculation 38.7 multiplied by 3 was a common incorrect answer. In part (c), most candidates found the correct fraction of their answer in part (b). Often by measuring the angles in part (d), many candidates appreciated that the USA had the greatest proportional increase. Spain was also a common answer, although Spain had the greatest proportional decrease.

Question 4

In part (a), most candidates understood that it was necessary to add the number of fixed penalty tickets and the number of court cases but failed to obtain the correct answers. Correct answers for the percentages who were fined after a court case were relatively rare so that the remarkable variation, for example between Northamptonshire and the Met, was rarely seen.

Question 5

Many candidates completed this question well, with part (c) being the best attempted part. It was surprising that candidates who had done well in the previous four questions often did this probability question badly.
A number of candidates used the data given in the question in all possible ways so that in part (b) instead of $1 – 0.9 = 0.1$, it was common to see $120 – 0.9 = 111$.

Question 6

Many candidates appreciated that the diagram was too squashed to be clear. In part (b), again, most candidates saw that the actual prices dropped between 2001 and 2003 before a slight recovery in 2004. Very few appreciated that the diagram gave no information about "demand", which was the headline given. Others decided that the graph had a false zero as the years started from '01, that is, 2001.

Making Connections in Mathematics (6987)

Intermediate

General

No candidates sat this examination in 2006, but grade boundaries selected by the principal examiner are provided for information in the *Mark Ranges and Award of Grades* section. This was the final assessment series for unit 6987.

Using Algebra, Functions and Graphs (6988)

Intermediate

General

The entry for this examination was of mixed ability, with a number of candidates inappropriately entered at this level. However, most candidates were able to make reasonable attempts at the majority of questions with a good proportion of these producing answers of a high standard. Most candidates attempted all the questions, indicating that the time was adequate. Graphs were interpreted well with candidates showing good understanding of most of the topics covered.

Question 1

Most candidates attempted the correct multiplication in part (a), and obtained the correct value. Some failed to convert their answer to standard form and those who did often did not give their answers to one decimal place.
It was a common error in part (b) to see speed being divided by distance to find time, rather than in the correct order. Candidates who did carry out the correct division often thought that 499 was the answer in minutes.

Question 2

Generally it was disappointing to see so many candidates failing to understand what was required in part (a).
Many candidates failed to express the equations correctly in part (a)(i). Those who did often went on to give incorrect equations on the answer line.
In part (a)(ii), the correct equations often appeared even when (a)(i) was incorrect. Candidates who began this part with the correct simultaneous equations usually went on to obtain the
correct values for c and d.
Part (b)(i) was not answered well, with 22 +n and answers which were multiples of 22 being seen.
Very few candidates gained full marks for part (ii) as (b)(i) was not answered correctly.

Question 3

Part (a) was answered well and even those candidates who failed to get both marks managed to substitute correctly into the formula.
Most candidates were able to state the correct gradient in part (b).
In part (c), most candidates used the gradient-intercept method and drew a line through the point (0, – 9). Candidates were less successful in drawing the line with the correct gradient.
The line $a = -20$ was sometimes drawn in error in part (d)(i) and non-horizontal lines passing through (0, – 20) were not uncommon. Many candidates obtained the correct answer in (d)(ii) using the graph, others correctly calculated the actual temperature algebraically. A common error was to read off the line $e = 1.3a - 9$ rather than $e = 1.4a - 12$.

Question 4

Weaker candidates wrote in the values 5, 10, 20 for part (a), thinking the relationship was linear. Most obtained the correct values 15, 20, and 0.
Points were usually plotted and joined accurately in part (b).
Part (c)(i) was generally well answered, although weaker candidates misread the scale and read off at a height of 16.5 metres. Most thought the answer was found by dividing 18 by their time from (c)(i).
The majority of candidates were unable in part (d) to substitute $b = -20$ into the equation successfully, which meant a large proportion of incorrect answers.

Question 5

The majority of candidates answered part (a) well.
In part (b), some candidates added a lid to the net and many failed to simplify or simplified incorrectly.
Only the most able candidates were able to gain full marks for part (c) of the question. $2xy = 300$ and $xy = 150$ was as far as many got. This part was not attempted by many candidates.
Candidates generally answered part (d) well, with the correct results obtained.
In part (e), most candidates plotted (8, 257), (10, 250) and (18, 255) correctly. The points (14, 249) and (16, 251.5) proved more difficult. Candidates who rounded (16, 251.5) to (16, 252) before plotting were generally more successful.
Correct points were read from the graphs in parts (f) and (g) by the majority of candidates who completed their curves.

Coursework Portfolios

Advanced Level

It was pleasing to note that most of the centres who entered candidates at this level this session assessed their work within approved tolerances.

This year there was, again, a considerable increase in the entry for the advanced courses. The majority of candidates produced creditable portfolios, with only a minority appearing to find the coursework challenging. A few centres produced very impressive portfolios. These included a number of portfolios which were clearly written principally for their other studies; this cross-curricular work usually stimulated candidates to produce interesting portfolios of their best standard.

However, it was noticeable that centres differed widely on the amount of annotation which they gave to their work. Annotating the work is helpful to candidates as it provides them with feedback and this feedback can often identify which parts of the criteria they need to include within the next part of their portfolio.

It is also a requirement of QCA's code of practice that annotation is used to identify those parts of the portfolio particularly worthy of credit, in order to justify the mark awarded. This annotation may be on the portfolio itself or on the candidate record form. Occasionally, portfolios are supplied with neither portfolio annotation nor adequate comment on the candidate record forms. This is contrary to the code of practice.

This year QCA has targeted plagiarism; hence moderators were required to check that all candidate record forms were signed by the students. Fortunately, it was necessary in relatively few cases to require centres to supply additional candidate record forms, this time signed by the candidates. It was a requirement of QCA that, this year, any portfolio with an unsigned record form should be awarded zero marks.

The majority of centres supplied very good portfolios but a few centres included portfolios which were somewhat disappointing, often significantly incomplete. Portfolios which are incomplete need to be scaled down. The new 2007 specification lists the necessary scaling for each unit. Also in the 2007 specification are details of any topics which are required to obtain specific grades.

Centres should check both the 2007 specification and the FSMQ Teachers' Guide during the next year as some revisions will come into effect. These documents are available both on the AQA website and from AQA in paper form.

There was, however, evidence that some centres were awarding their candidates marks which were too high. Particularly in 6990, 'Using and Applying Statistics', high marks were awarded for work which included little material of AS standard. Marks of over forty out of fifty should only be awarded for work which is of grade A standard at AS level. These portfolios should show competence in dealing with the difficult parts of the specification, including the normal distribution. All Statistics portfolios, with a **total** mark of 13 or over, **must** include at least one of the 'extension possibilities'.

This year, the main problem areas in the portfolios occurred where grade A marks (ie 40 or over) were given inappropriately (see the teachers guide). These areas are listed below.

Using and Applying Statistics

A significant number of centres only completed 'core' statistics work or gave high marks to candidates who, for example, only carried out relatively simple topics such as stem and leaf and Spearman's rank correlation coefficient.

Working with Algebraic and Graphical Techniques

A high number of centres either did not carry out the linearisation task at all, or if they did, the work was not understood. Centres used software to find the parameters required and then confirmed the answers by carrying out the linearisation instead of starting with the linearisation.

Modelling with Calculus

Some centres awarded the highest grades to candidates who only carried out basic differentiation and integration and did not include trigonometry, etc.

To enter candidates for AS Use of Mathematics, centres must enter candidates for two advanced FSMQ units and it was common to receive a separate centre declaration sheet for each unit. However, only one centre declaration sheet is required covering **all** the advanced level units, confirming that each of the advanced units had been assessed at the same standard. If the same tasks are to be used in more than one unit, it is essential that the tasks are assessed separately and that the satisfaction of the specification for each unit is confirmed. For example, if one task is included in both 6991, 'Working with Algebraic and Graphical Techniques', and 6992, 'Modelling with Calculus', a high grade in 6991 does not imply that a high grade is appropriate in 6992 unless the calculus requirements are all met competently.

Examinations

Using and Applying Statistics (6990)

Advanced

General

The marks achieved by candidates covered a wide range and varied from centre to centre. Some centres had prepared their candidates well for the demands of this paper, but the candidates at other centres seemed not to have covered some of the topics or to have a very poor understanding of them. In particular, question 4 (finding information from a histogram) and question 7 (based on the normal distribution) were sometimes omitted by most of the candidates from some centres.

Question 1

Most of the candidates made a good or reasonable attempt at this question. Those who used the statistical functions on their calculators were generally able to find the mean values, correlation coefficient and equation of the line of best fit. Unfortunately there are still a few centres encouraging candidates to draw up tables of squares and products. Candidates who did this usually made one or more mistakes and lost all of the marks for this part of the question.

In part (b), many of the candidates used the mean point and intercept to draw the correct line of best fit. A significant minority also achieved full marks by plotting points calculated from their equations.

The quality of the responses to parts (c) and (d) varied widely. Some candidates gave clear, succinct interpretations of the gradient and correlation coefficients, whilst others gave very sketchy or confused answers that showed a lack of understanding of these measures. Some candidates lost marks by not comparing the two correlation coefficients.

Question 2

In part (a), many candidates were able to calculate the number of guillemots in 2002 after the 136% increase, but a significant number of candidates gave the increase as their answer rather than the new total. Less than half the candidates were able to cope with the reverse percentage calculation required to answer part (a)(ii) and even fewer gave a correct solution to part (b). Those candidates who did complete part (b) correctly often did so by assuming a value for the number of puffins in 1970.

Question 3

The answers to parts (a)(i) and (ii) of this question were often disappointing, with some candidates simply quoting the angles given for the car sectors on the pie charts rather than giving proportions as required. Other candidates incorrectly assumed that they needed to use the areas of the pie charts in some way. In part (a)(iii) many candidates said that there were more cars on urban roads rather than commenting on the proportions. As a result, candidates often did not achieve many marks for this straightforward part of the question.

Part (b) of the question was more difficult. Whilst there were some candidates who were able to find the answers using the facts that frequency is proportional to the angle of the sector and total frequency is proportional to the area of the pie chart, the majority did not understand the concepts involved and were unable to find either of the answers.

Question 4

Many candidates achieved the first mark by giving the relevant frequency densities, but often did not know what to do with them. Some candidates simply added them whilst others divided by the column widths instead of multiplying. Relatively few of the candidates went on to find correctly the percentage of cars that were breaking the speed limit. Even those candidates who had correctly multiplied by the column widths tended to forget the thousands in the label on the frequency density axis and consequently ended up with a percentage that was far too small.

Question 5

Although most candidates knew how to find the median and interquartile range in part (a), a significant number lost marks by carelessly assuming that the total frequency was 3000 thousand instead of 2500 thousand. Many candidates achieved all the marks for part (b), but there were some who found the percentage of motorcycles that were not breaking the speed limit, rather than the percentage that were breaking the speed limit.

Question 6

The responses to part (a) of this question were very disappointing. Finding the mean and standard deviation from a grouped frequency table should be a standard method understood by all candidates, but some of them simply found the mean and standard deviation of the frequencies and went on to discuss these values in later parts of the question, even though they were obviously incorrect. In other cases where candidates gave wrong values, this may have been because they entered one or more values incorrectly into their calculators or forgot to change the setting. This unfortunately meant that they lost all four marks for this part of the question. Candidates should be advised to be extremely careful not to make errors of this sort. Overall, correct answers for this straightforward part of the question were depressingly few and far between.

However the majority of the candidates did achieve the mark for part (b) and some candidates were also able to pick up some marks in part (c) by correctly interpreting the values they had found earlier, whether or not those values were correct.

Question 7

As stated previously, candidates from some centres omitted this question. Those candidates who did attempt it tended to do well and relatively few of them made errors in standardising or finding the correct probability from the normal table or their calculators. Most gave the correct percentage in part (a) and then went on to use it to find the expected frequency in part (b).

In part (c), some candidates did not realise that they were meant to compare the expected frequency they had found in part (b) with the number of boys in the sample who were more than 170 cm tall. Those who did usually achieved most of the marks for this part and, overall, there were a pleasing number of high marks scored in this question.

Working with Algebraic and Graphical Techniques (6991/2)

Advanced

General

This paper was accessible to candidates, with many showing that they were well prepared and they had sufficient time to complete the paper. The standard of presentation was usually good, but too many candidates did try to compress their answers onto one or two sides of paper and this made it more difficult to mark. The graphical questions were well answered in comparison with the algebraic questions, but some candidates did just plot the points, especially in questions 4 and 5, and then failed to join them up. The descriptions of geometrical transformations were, again, very poor. Often the explanations did not link the model with the data. Too many gambled on using trial and improvement to solve equations and often scored no marks as their answers were not accurate enough.
There were very few candidates who scored less than 20 or more than 50.

Question 1

Most scored full marks on this question. In part (a), a few rounded their values to 2 significant figures and, in part (c), gave an answer of 3600. In part (d), some misread their correct graph and gave values outside the allowed range.

Question 2

The percentage error calculations were done better than in previous years but some did divide by 286.8 or just did 286.8÷350. In parts (b) and (c)(i), some gave long ecological or environmental discussions rather than comparing the model with the data. There were very few correct answers to part (c)(ii), as most put the two models separately equal to 0 and solved two separate quadratic equations.

Question 3

Most got part (a) correct but some confused the 2 parts and solved $60 = 75e^{-x/50}$ and then worked out $75e^{-30/50}$. In part (b) some gave irrelevant statements such as "at age 76 you were old and so would not live much longer". Many drew quadratic or exponential graphs for part (c) but made valid comparisons in part (ii). Many said that the life expectancy stayed constant for many ages in part (d)(ii) without commenting on the asymptotic behaviour.

Question 4

Most candidates did not complete a table of values in part (a) but had 4 correct points that fitted the overlay. Many did not realise that the curve had a maximum at 18 and often had their maximum at 20. The drawing of tangents was very badly done in part (c), with many just getting the gradient from a chord, which scored no marks. Most were vague about the units, with answers of "sales per year" or "£100 per year" neither of which were allowed. Most got part (d) correct but very few got part (e) correct, with many using translations or using amplitude or frequency.

Question 5

Many got the proof correct in part (a)(i) but some fiddled the answer from expressions such as "ln N = ln k x ln(t^c)". In part (ii) many did not give all the values to 3 significant figures with 0.69 being the usual error for 0.693. Part (iii) was very well done and most gave the equation in part (iv) as "$y = 2.5x + 4.25$" which scored two out of the three marks. Most ignored part(v) or repeated their answer to part(iv). Part(b)(i) was well done but many failed to realise the answer had to be an integer, and so only scored one out of two marks. In part (ii), many set up the correct equation but then stopped. Finding the 3.6^{th} root of 20 was as popular as using logarithms and both were valid methods.

Modelling with Calculus (6992/2)

Advanced

General

A significant proportion of candidates were well prepared for this examination, scoring very creditable marks. Questions one and two were found to be a good source of marks, with many candidates able to show their skills. However, the solution of a quadratic equation, in question 1 part (f), and question 2 part (a), caused problems to a significant number of candidates. Question 3 was also answered well by those candidates who were able to show their knowledge of the principles of trigonometric curves. However, question 4, on logarithms and exponentials, was badly attempted by most candidates.

Question 1

Part (a) was answered well, although a minority did not appreciate that the answer of –1 for the height in part (a) (ii) referred to the ball being 1 metre below the height at which it was hit.
Part (b) was answered well, but in part (c) a disappointing number of candidates were unable to solve the equation $4 - 10t = 0$.
Parts (d) and (e) were usually completed correctly. In part (f), most candidates substituted $y = 2.4$ rather than $y = -2.4$. The solution of their quadratic was rarely completed successfully.

Question 2

Most candidates attempted to differentiate the given cubic in order to find the maximum of h. The majority obtained $\frac{\mathrm{d}h}{\mathrm{d}t} = 6t - 0.9t^2$ which they equated to zero. A significant proportion then made no real progress in solving this quadratic, whilst a few used their graphic calculators to find quickly $t = 0$ or $t = 6\frac{2}{3}$. (They were awarded full marks for the correct use of their calculators.) Those who did obtain $6\frac{2}{3}$ as their solution usually found correctly the height of h.
Part (b) was answered well, usually from the given graph. In part (c)(i), most candidates attempted to use the trapezium rule but they sometimes simplified it by using a different number of strips or by using only approximations for the values of h. In part (c) (ii), those who integrated each term correctly quickly obtained the correct answer, although often $\int 43\,\mathrm{d}t$ was given as $\frac{43^2}{2}$ or left as 43. Others integrated the denominator to obtain $8h$. Part (d) was well answered by most candidates. In part (e), many candidates found $\frac{\mathrm{d}^2h}{\mathrm{d}t^2}$, but often could not solve the equation $6 - 1.8t = 0$.

Question 3

In part (a), most found the two values of V required. Encouragingly, this session, only a few did not appreciate that they should use radians.
Part (b)(i) was answered fairly well whereas part (ii) was answered badly by the majority, with only the better candidates considering the shape of the trigonometric curve. The interpretation required in part (c) (ii) was answered well.

Question 4

Part (a)(i) was answered well, although a significant number failed to simplify $\frac{1}{40}(20-5)$ to 0.375. The interpretation of this result was rarely correct in part (a) (ii).
In parts (b), (c) and (d), candidates could rarely convert from a log equation to the exponential equivalent. The 18 required in part (b) usually appeared as if by magic, and few simplified $\frac{1}{\mathrm{e}^{\frac{1}{40}t}}$ to $\mathrm{e}^{-\frac{1}{40}t}$ in part (c). Those who made progress in part (c) usually found the temperature required in part (d). The limits required in part (e) were often stated correctly.

Applying Mathematics Paper 1

AS Use of Mathematics UOM4/1

General

It was clear that the majority of candidates were fully familiar with the pre-release material and could therefore tackle the paper with some confidence.
On occasions, candidates could have perhaps gained greater credit if they had been able to use their graphic calculators more effectively. For example, when sketching graphs they should make sure that they indicate their general shape and any significant features such as where the graph turns, cuts the axes and so on (see specific comments relating to questions 1 and 4 below). When using values obtained by tracing graphs, for example, when finding the coordinates of points of intersection rather than obtaining such values analytically, they should work as accurately as possible (see specific comments relating to question 5 below).
It is also important when asked to show calculations or an algebraic argument leading to a given result that each step is shown fully (see specific comments relating to questions 3 and 6 below).
Overall, many candidates worked well, presenting their answers using correct mathematical notation, although some failed to label axes of graphs or to give units to their solutions. However, candidates' mathematical arguments were not always clear and many failed to gain a great deal of credit for this. Candidates should be encouraged to take some care in ensuring that their work is clear in this regard as the paper's design allows time to do so.
An erratum notice was issued for this question paper to correct a typographical error on the data sheet.

Question 1

(i) The vast majority of candidates answered this question, although a few did not show in full the general shape of the graph by plotting only the portion of the graph for $x \geq 0$.

(ii) Many candidates did not describe the geometric transformations using correct terminology. For example, phrases such as "flip across the x – axis" were used instead of "reflection in the x – axis". Many indicated that a stretch was involved but failed to indicate its direction or scale factor.

Question 2

Many candidates were able to answer this question correctly indicating that they were well prepared and familiar with the pre-release material.
A minority having correctly found that the foot of the bridge has an x – value of 13.5 went on to work with the given function $f(x) = -0.05x^2$ to find a y – value.

Question 3

This algebraic derivation had been anticipated by many candidates who were able to show correct working clearly. However, a substantial minority, who had clearly attempted to recall the derivation were unable to do so convincingly.

Question 4

Many candidates, whilst giving a clear sketch indicating the general shape of each function, did not indicate the significant feature of each graph, that is where it cuts the y – axis, correctly. Almost all candidates were able to indicate which of their sketches was of which function.
A small number of candidates were clearly calculating values to plot points for their sketches. All candidates should be encouraged to use graphic calculators effectively as it is assumed that they will have access to them throughout the examination.

Question 5

This question was answered well by many candidates, with many giving correct analytic solutions. A substantial number, however, arrived at correct answers using their graphic calculators to find accurately where the line $y = -5$ intersects $f(x) = -0.05x^2$. It is important if candidates choose to use their graphic calculators in this way that they ensure they have accurate values to work with.

Question 6

This question was well answered by many candidates. Only a small number found the error and expressed this as a percentage of the value given by the catenary function.

Question 7

This was perhaps the least well answered question on the paper, with candidates having to work with a new function and take account of scaling (although this was the same as that introduced on the pre-release data sheet). Many made some progress in their attempts to find the span of the bridge, although some chose to substitute the numerical value 90 as x into the given function. Others took no account of the scaling and attempted to solve the equation $90 = 0.075x^2$.

Applying Mathematics Paper 2

AS Use of Mathematics UOM4/2

General

The vast majority of candidates were able to make attempts to answer each of the questions meeting with at least some success. As is often the case with this paper, candidates appeared to be best prepared to tackle the questions involving recurrence relations and the simulation.

Question 1

A substantial number of candidates produced disappointing responses to this question, particularly in parts (b) and (d), in which they were asked to give the equations of straight lines. Although expressly asked to give these equations in terms of the variables P and Q many gave their equations in terms of x and y.
Many candidates were able to interpret the significant points, where the straight lines cut the axes of the graphs in parts (a) and (c), although a substantial number had difficulty in expressing their understanding in words. It is important that candidates are encouraged to consider the situations and contexts that they are asked to work with in this paper.
Part (e) of the question was invariably badly completed if tackled, although the resulting simultaneous linear equations were straightforward to solve. This appears to be an area of the specification that may have been overlooked. The final part of this question (part (e)) was therefore difficult for candidates and was often omitted.

Question 2

In general, this question was well answered by many candidates, who seemed well prepared to cope with recurrence relations. Part (a) was well answered by many, although a number of candidates did not show working sufficient to gain full marks. In part (b), the vast majority of candidates identified the 0.0125 as being that part of the multiplying factor responsible for the increase of 1.25% but did not explain, or perhaps fully understand, that the 1 of the 1.0125 is responsible for including the remaining balance from the previous month.
Part (c) was answered well by many candidates, although some ignored the direction to give answers to the nearest penny and a number gave negative values in the final two rows when the balance was clearly zero. Candidates should be encouraged to work to a sufficient degree of accuracy throughout that they obtain accurate values at each stage.
The majority of candidates were able to correctly calculate the total price paid for the camera and most then were able to state the amount paid in interest and express this as a percentage of the original price. Those candidates who had worked successfully to this point were often able to go on and calculate the new amount that Amir would pay in interest if he doubled his monthly payments. It was encouraging to see many working in a sustained way at this less structured part of the question. Many correctly stated and worked with an appropriate recurrence relation. These candidates were then able to correctly argue the case of whether or not the interest paid was more or less than half.

Question 3

As is often the case, although the simulation question requires a relatively substantial amount of reading, many candidates answered this correctly and appeared to really understand the context and worked with care.
In the first part of the question for day-time calls, where the random integers had been assigned, the vast majority understood and were able to explain why four out of the ten random integers (0 to 9 inclusive) were allocated to a call receiving no reply.
In part (b), many candidates worked carefully to fill in the table on the Answer Sheet. Only a very few did not understand the term "cumulative time" and did not deduce its meaning from the first half of the table which had been completed on the Answer Sheet.
The vast majority of candidates went on in part (c) to allocate random integers for evening calls in the way the question required (that is, in the same way as had been given for part (b)). Very few decided to allocate integers such that the correct number of integers were allocated to each event but in an incorrect order. If this was the case, their incorrect working was followed through to part (d), which again many candidates correctly answered.
Many candidates answered part (e) correctly, apparently understanding fully the context of the simulation.
A disappointing number were unable to answer correctly the final part of the question, which asked for a way in which the simulation could be improved. In such questions, it is important that candidates consider how the simulation was set up and consider how it might better reflect reality. In this simulation, for example, it is unlikely that phone calls will last for whole numbers of minutes in the way simulated.

Question 4

Many candidates made substantial progress with parts of this question: it was clear that they were often quite comfortable working with exponential functions.
In the first part ,many correctly substituted $t = 0$ to find the initial temperature. It is important that when asked to show, or confirm, a given result that candidates are encouraged to show calculations or working as fully as possible.
Part (b) was less well answered, with many unsure how they should work algebraically and with logarithms. Many statements seen were unclear and unable to gain credit.
However, many candidates were then able to go on to confirm that $k = 1.39$ in part (c). Many then made some progress with part (d), although some, having found a correct value for t in hours, were unable to convert this correctly into minutes.
Invariably, the sketch graphs produced as answers for part (e) failed to gain full credit. Again, candidates did not indicate clearly the significant features of the exponential decay (the intercept with the vertical axis and the horizontal asymptote). Candidates should be encouraged to graph the function with their graphic calculator and make a clear sketch of the result.
A substantial number of candidates were able to correctly sketch an appropriate exponential function for part (f) but some of these forgot to state whether the given conditions would make k smaller or larger.

Mark Range and Award of Grades

Foundation Level

6981 Managing Money

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
6981/1: Coursework Portfolio	51	51	24.1	10.2
6981/2: Written Paper	40	51	30.3	10.8
6981 Managing Money	91	102	54.5	17.4

		Max. mark	A	B	C	D	E
Coursework Portfolio Boundary Mark	raw	51	40	32	24	17	10
	scaled	51	40	32	24	17	10
Written Paper Boundary Mark	raw	40	33	29	25	21	17
	scaled	51	42	37	32	27	22
Unit Scaled Boundary Mark		102	82	69	56	44	32

Provisional statistics for the award (2573 candidates)

	A	B	C	D	E
Cumulative %	5.1	22.3	44.8	66.4	84.9

6982 Working in 2 and 3 Dimensions

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
6982/1: Coursework Portfolio	51	51	20.3	9.6
6982/2: Written Paper	40	51	24.4	11.6
6982 Working in 2 and 3 Dimensions	91	102	44.7	17.7

		Max. mark	A	B	C	D	E
Coursework Portfolio Boundary Mark	raw	51	40	32	24	17	10
	scaled	51	40	32	24	17	10
Written Paper Boundary Mark	raw	40	33	28	23	18	14
	scaled	51	42	36	29	23	18
Unit Scaled Boundary Mark		102	82	68	54	41	28

Provisional statistics for the award (288 candidates)

	A	B	C	D	E
Cumulative %	1.7	10.8	27.1	50.3	75.0

6983 Making Sense of Data

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
6983/1: Coursework Portfolio	51	51	24.8	9.9
6983/2: Written Paper	40	51	28.6	9.8
6983 Making Sense of Data	91	102	53.4	16.5

		Max. mark	A	B	C	D	E
Coursework Portfolio Boundary Mark	raw	51	40	32	24	17	10
	scaled	51	40	32	24	17	10
Written Paper Boundary Mark	raw	40	31	28	25	22	19
	scaled	51	40	36	32	28	24
Unit Scaled Boundary Mark		102	80	68	56	45	34

Provisional statistics for the award (983 candidates)

	A	B	C	D	E
Cumulative %	4.7	19.4	43.9	66.1	81.6

Mark Range and Award of Grades

Intermediate Level

6984 Calculating Finances

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
6984/1: Coursework Portfolio	51	51	21.3	10.2
6984/2: Written Paper	50	51	15.5	9.3
6984 Calculating Finances	101	102	36.7	17.6

		Max. mark	A	B	C	D	E
Coursework Portfolio Boundary Mark	raw	51	40	32	24	17	10
	scaled	51	40	32	24	17	10
Written Paper Boundary Mark	raw	50	35	31	27	23	19
	scaled	51	36	32	28	23	19
Unit Scaled Boundary Mark		102	76	64	52	40	29

Provisional statistics for the award (251 candidates)

	A	B	C	D	E
Cumulative %	2.8	10.0	19.9	39.0	57.0

6985 Solving Problems in Shape and Space

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
6985/1: Coursework Portfolio	51	51	13.2	5.5
6985/2: Written Paper	50	51	7.2	4.0
6985 Solving Problems in Shape and Space	101	102	20.2	7.4

		Max. mark	A	B	C	D	E
Coursework Portfolio Boundary Mark	raw	51	40	32	24	17	10
	scaled	51	40	32	24	17	10
Written Paper Boundary Mark	raw	50	36	31	26	22	18
	scaled	51	37	32	27	22	18
Unit Scaled Boundary Mark		102	77	64	52	40	28

Provisional statistics for the award (47 candidates)

	A	B	C	D	E
Cumulative %	0.0	0.0	0.0	0.0	19.1

6986 Handling & Interpreting Data

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
6986/1: Coursework Portfolio	51	51	23.1	9.2
6986/2: Written Paper	50	51	23.2	11.2
6986 Handling & Interpreting Data	101	102	46.2	17.1

		Max. mark	A	B	C	D	E
Coursework Portfolio Boundary Mark	raw	51	40	32	24	17	10
	scaled	51	40	32	24	17	10
Written Paper Boundary Mark	raw	50	37	33	29	25	22
	scaled	51	38	34	30	26	22
Unit Scaled Boundary Mark		102	78	66	54	43	32

Provisional statistics for the award (237 candidates)

	A	B	C	D	E
Cumulative %	3.8	15.2	33.3	54.0	76.8

6987 Making Connections in Mathematics

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
6987/1: Coursework Portfolio	51	51	-	-
6987/2: Written Paper	50	51	-	-
6987 Making Connections in Mathematics	101	102	-	-

		Max. mark	A	B	C	D	E
Coursework Portfolio Boundary Mark	raw	51	40	32	24	17	10
	scaled	51	40	32	24	17	10
Written Paper Boundary Mark	raw	50	38	33	28	24	20
	scaled	51	39	34	29	24	20
Unit Scaled Boundary Mark		102	79	66	53	41	30

Provisional statistics for the award (0 candidates)

	A	B	C	D	E
Cumulative %	0.0	0.0	0.0	0.0	0.0

6988 Using Algebra, Functions and Graphs

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
6988/1: Coursework Portfolio	51	51	27.6	8.3
6988/2: Written Paper	50	51	23.0	11.2
6988 Managing Money	101	102	50.6	17.0

		Max. mark	A	B	C	D	E
Coursework Portfolio Boundary Mark	raw	51	40	32	24	17	10
	scaled	51	40	32	24	17	10
Written Paper Boundary Mark	raw	50	35	30	26	22	18
	scaled	51	36	31	27	22	18
Unit Scaled Boundary Mark		102	76	64	52	40	28

Provisional statistics for the award (186 candidates)

	A	B	C	D	E
Cumulative %	8.1	22.6	46.2	68.8	84.4

Mark Range and Award of Grades

Advanced Level

6990 Using and Applying Statistics

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
6990/1: Coursework Portfolio	51	51	24.6	9.3
6990/2: Written Paper	50	51	22.0	10.0
6990 Using & Applying Statistics	101	102	46.7	16.4

		Max. mark	A	B	C	D	E
Coursework Portfolio Boundary Mark	raw	51	40	32	24	17	10
	scaled	51	40	32	24	17	10
Written Paper Boundary Mark	raw	50	48	42	36	30	24
	scaled	51	41	36	31	26	20
Unit Scaled Boundary Mark		102	81	68	55	42	30

Provisional statistics for the award (1084 candidates)

	A	B	C	D	E
Cumulative %	2.2	11.9	34.6	60.4	82.4

6991 Working with Algebraic & Graphical Techniques

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
6991/1: Coursework Portfolio	51	51	26.8	10.0
6991/2: Written Paper	50	51	26.5	8.8
6991 Working with Algebraic & Graphical Techniques	101	102	53.4	16.1

		Max. mark	A	B	C	D	E
Coursework Portfolio Boundary Mark	raw	51	40	32	24	17	10
	scaled	51	40	32	24	17	10
Written Paper Boundary Mark	raw	50	44	39	34	30	26
	scaled	51	37	33	29	26	22
Unit Scaled Boundary Mark		102	77	65	54	43	32

Provisional statistics for the award (1542 candidates)

	A	B	C	D	E
Cumulative %	6.5	26.0	50.6	74.1	88.9

6992 Modelling with Calculus

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
6992/1: Coursework Portfolio	51	51	27.9	11.2
6992/2: Written Paper	50	51	23.0	9.6
6992 Modelling with Calculus	101	102	50.9	18.1

		Max. mark	A	B	C	D	E
Coursework Portfolio Boundary Mark	raw	51	40	32	24	17	10
	scaled	51	40	32	24	17	10
Written Paper Boundary Mark	raw	50	45	40	35	30	25
	scaled	51	38	34	30	26	21
Unit Scaled Boundary Mark		102	78	66	54	42	31

Provisional statistics for the award (316 candidates)

	A	B	C	D	E
Cumulative %	4.1	24.4	47.8	68.0	82.3

Mark Range and Award of Grades

AS Use of Mathematics

UOM4 Applying Mathematics

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
UOM4/1	30	30	11.7	6.8
UOM4/2	70	70	33.0	11.1
UOM4 Applying Mathematics	100	100	44.7	16.3

		Max. mark	A	B	C	D	E
Written Paper 1 Boundary Mark	raw	30	22	19	16	14	12
	scaled	30	22	19	16	14	12
Written Paper 2 Boundary Mark	raw	70	53	47	41	36	31
	scaled	70	53	47	41	36	31
Unit Scaled Boundary Mark		100	75	66	57	50	43

Provisional statistics for the AS award (1212 candidates)

	A	B	C	D	E
Cumulative %	2.2	11.3	30.6	56.2	79.9