



**General Certificate of Education**

**Use of Mathematics 5351**

**UOM4/1    Applying Mathematics Paper 1**

**Report on the Examination**

*2008 examination - June series*

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*Dr Michael Cresswell Director General.*

## *General*

The majority of candidates appeared well prepared for the paper and had clearly engaged in a substantial way with the pre-release material. Some candidates did not work carefully enough with the numerical values given in the data and with the recurrence relations and functions used to model the data. Because these values reflect the context, they were not always easy to work with and therefore great care needed to be taken. This is often the case in this component of assessment and candidates need to work carefully to ensure accuracy.

## *Question 1*

There was a pleasing response to part (a) of this question with candidates being well prepared to work with the recurrence relation in the way required and ensuring that the values in the table were given to the nearest penny. However, the sketch graph of the exponential function in part (b) was not always well drawn: candidates should make sure that the graph clearly represents the given function (in this case an exponential) rather than a vague curve, and they should also ensure that they indicate clearly intersections with axes (many candidates in this case failed to do this).

Many candidates were well prepared to find the value of  $k$  in the final part of the question although a number did not take care and gave the answer as 0.247 rather than 0.0247.

## *Question 2*

Candidates were well prepared for this question and the majority were able to produce a convincing mathematical argument leading to the required result.

## *Question 3*

Again many candidates were well prepared and able to use 'the rule of 70' correctly to arrive at the answer and had an understanding of some of the factors likely to limit the validity of any models associated with population growth.

## *Question 4*

(a) This part of the question was straightforward for many candidates. However, as is often the case when using numerical values associated with real situations, these can prove problematic if care is not taken. Here the growth rate of 1.75% resulted in  $1 + r$  having a value of 1.0175, which some wrote as 1.175. Great care needs to be taken when working with numerical values that reflect reality.

(b) Part (i) was completed successfully by many candidates. However, the interpretation required in part (ii) proved a stumbling block for many. It was important that candidates understood that the table in the article was itself relying on a mathematical model to make predictions of future populations.

For part (b), in a Chinese postman question candidates must consider all pairings of odd vertices to show that they have chosen the optimum route.

Part (ii) tested a candidate's understanding of a Chinese postman problem and only the most able candidates were able to score on this part of the question.

### ***Question 5***

In general, responses to this question were disappointing. Although many candidates could work with the given values to find the gradient of a line joining the two points very few could work beyond this to arrive at the correct equation of the straight line. Although candidates were clearly comfortable with the general equation of a straight line the values necessary to reflect the real situation appeared to make the necessary calculations too difficult.

### ***Question 6***

Many candidates worked carefully through this question to arrive at the correct result. However, again a substantial minority did not take the required care when working with this complex recurrence relation.

### ***Question 7***

Many candidates were able to state the limiting value of the world's population suggested by the given logistic equation, but were unable to explain why this was the case.

### ***Mark Ranges and Award of Grades***

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