

## **Application of Number Level 3 March 2006**

### **General Comments**

The paper had a range of interesting questions, but was overall quite long, and some questions required a good deal of reading. There were more than the usual number of one-mark questions for which candidates frequently did much correct work but made a single error and received no credit. The 15 minutes reading time did not appear to have been used effectively by candidates. It is recommended that centres instruct candidates how to use this time constructively, to read and understand questions, to identify key information, select methods and make rough notes.

The pass mark on this paper was similar to previous series but the proportion of candidates obtaining a pass mark was lower than previously. There was wide variation in the performance of candidates from different centres. Some candidates were clearly prepared for the test, whereas others seemed to lack the necessary skills and knowledge to make a reasonable attempt at the questions.

The questions answered most successfully were those involving trigonometry, calculating a percentage increase, and interpreting information from a bar chart and a pie chart. Questions involving compounded percentages and using a formula were often handled well by stronger candidates, but others showed weaknesses in these areas. The weakest responses were seen on questions on finding the mean of grouped data, converting units, and algebra.

Incorrect rounding was a common reason for incorrect answers; candidates lost marks by failing to give an answer to a sensible level of accuracy. Often premature rounding or truncation of values led to inaccurate final results.

### **Comments on Particular Aspects of the Question Paper**

The paper opened with a relatively straightforward question on a farmer's income that will have provided an encouraging start to candidates. A subsequent part question involving scaling dimensions to find the area of a field posed problems for many, with a common error being to find the area of the scale plan and then apply the scale factor only once.

A question involving use of a formula to estimate the height of a tree was answered correctly by stronger candidates. Many others were successful in substituting in the formula, correctly using the radius rather than the diameter which was given in the question, but they failed to rearrange the formula correctly. In a subsequent part question, a surprising proportion of candidates failed to convert metric units correctly, working with 10 centimetres to the metre, or 100 millimetres to the metre.

The trigonometry question was handled well by many candidates who correctly calculated the angle of a ramp, although some failed to make an appropriate comment on the suitability of the angle for a stated purpose, possibly through misreading the information given. Misinterpretation of a diagram was a common cause of error in a part question about a different ramp, where candidates wrongly assumed the ramp rested on a step, forming a triangle. The use of a combination of imperial and metric units in this question did not often result in errors, but was perhaps unrealistic in the context.

The statistics question was well handled by stronger candidates. Common errors were in finding the mean of grouped data, where some candidates divided the total frequency by the number of intervals, and others failed to calculate correct mid points. In response to a question that asked which of the mean or median was better in the stated context, many candidates correctly chose the median, but few were able to give a valid reason. In a question that asked for an approximate fraction, no credit was given for answers in the form of a decimal or a percentage, or where no approximation was shown. In a part question about sponsored bricks in a building restoration project, many candidates used a correct method to find the number of bricks required, but failed to round the answer correctly, some not rounding to a whole number at all, others rounding down, which was inappropriate in the context given.

Many candidates failed to choose a suitable method to deal with a problem involving a compounded percentage. There were many attempts at a long method, where candidates calculated a reduction year by year. Apart from being inefficient, especially as the question asked for the reduced value after 15 years, this method was prone to error, either through miscopying figures or premature rounding. A question about CO<sub>2</sub> emissions was rarely done correctly, mainly through errors in converting between metric units or in some cases use of an incorrect value for the number of days in a year.

The extended answer question was interesting but long and few candidates finished every part. Completely correct graphs were seen infrequently; in general plotting of points was accurate, but there were many instances of missing titles and incorrect axis labels. Some candidates chose scales that were too small for the data, while others failed to extend their axes sufficiently to allow for extrapolation, an error which may have been avoided if they had read the question in full before starting. Several part questions involved reading and interpreting a good deal of information to do multi-stage calculations. Errors in these questions often arose through incorrect choice of method. For example, in a question about the costs of running a playgroup per morning session, some candidates included the insurance figure for the whole term. In a part question about orders for Tee-shirts, it was not clear how the postage was to be treated or how VAT should be applied. Despite this, correct methods were seen, but few candidates rounded the answer in a way to suit the context. Few candidates reached the questions on simultaneous equations. Correct equations were rarely seen, although some candidates derived correct solutions using other methods.

## **Recommendations to Centres**

Centres must ensure that candidates:

- use the reading time to best effect, to read and understand questions, identify key data and plan their approach to solving the problems, making rough notes if necessary
- practise breaking down complex problems into manageable steps
- solve problems involving construction and solution of simple equations
- practise solving problems involving conversion between metric units
- choose suitable levels of accuracy and be guided by the data provided
- avoid premature rounding in multi-stage calculations
- check to see they have answered each question fully after finishing it
- choose appropriate scales and follow the conventions used for graphical presentations, in particular titles, appropriate labelling and units.