

Application of Number Level 3 November 2005

General Comments

The paper used in this series was comparable in standard to previous papers. It was well balanced and covered a range of skills specified in part A of the Application of Number standards. In this series, candidates were allowed 15 minutes reading time prior to starting the test. This does not seem to have made much difference to the performance as a whole, as a substantial proportion of the candidates did not complete the final question, some of whom had demonstrated skills at an appropriate level in earlier questions. The extended answer question itself was shorter than on previous papers, but in the paper as a whole there were several 3-mark questions which were complex and demanding, and will have taken a good deal of time to answer. The graph question was flawed in that the values given were difficult to plot on reasonable scales, and this too will have been time-consuming.

The pass mark was similar to previous series, but the proportion of candidates obtaining a pass mark was low. There were fewer candidates with very low scores than in previous series but many candidates failed to answer questions correctly either through incorrect choice of method, failure to interpret the information given correctly or through errors in calculation. 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.

The questions answered most successfully were those involving percentages, conversions from imperial to metric units, using a formula and using Pythagoras' theorem. Questions involving complex multi-stage calculations, using a scale drawing and compounded percentages were often handled well by stronger candidates, but others showed weaknesses in these areas. The weakest responses were seen on questions involving checking answers, using algebra, calculating volume and interpreting graphical and statistical information. Calculating the mean using grouped data was once again a weak area for many candidates.

Comments on Particular Aspects of the Question Paper

The paper opened with a relatively straightforward question about mail delivery, which proved surprisingly difficult for many candidates. Some were unable to evaluate 100% - 99.92% while others who used the correct method failed to write the number of undelivered items with the correct number of zeros. A common error on a percentage increase question was to use the final value rather than the initial value as the basis of the calculation. In a problem involving the speed of delivery of a letter, most candidates were able to use the time, distance, speed equation correctly but few correctly calculated the time taking into account different time zones and gained no credit for their answer.

A question about lavender oil production was poorly answered. Many candidates misinterpreted the information given and calculated on the basis of one third of the lavender being processed for lavender oil rather than two-thirds. Candidates showed that they could convert between units and use a ratio successfully, but many instances of premature rounding or truncation were seen, leading to inaccurate final answers. In a part question about the floor area of a building shown on a scale drawing, many candidates found the dimensions correctly but lost marks through inappropriate or incorrect rounding,

In a question involving use of a formula many candidates substituted correct values into the formula, in most cases correctly using the radius rather than the diameter which was given. Few candidates were able to gain full marks as they gave an answer to an inappropriate level of accuracy. In a part question involving conversion between dollars and pounds many candidates showed that they were able to use the given conversion rate correctly, but few of them went on to calculate the price of a gram of metal given the price per tonne, with the most common errors being in dividing by 1000000 or in premature rounding

A question about bread consumption was handled well by stronger candidates. The reverse percentage and compounded percentage questions were generally done correctly, but the part question on the cost of electricity used by a home breadmaker proved very difficult, with many unable to identify a correct method, others confusing pounds and pence, or giving an unrounded or incorrectly rounded answer.

A question involving a right-angled triangle was well handled by a reasonable proportion of candidates. Common errors included adding instead of subtracting when using Pythagoras' theorem, omission of the final simple addition to find the answer required or incorrect rounding. Few candidates correctly calculated the volume of a crane bucket with a trapezium section, with many unable to find the area of the trapezium. A fairly straightforward calculation of the weight of a bucket of concrete mix to be used to read from a graph to find the maximum reach of a crane was well handled. The final part of this question could be solved by using straightforward algebra, but the majority of candidates attempted a trial and improvement method, not always successfully.

Most candidates gained some marks on the graph question. The data given in the question were difficult and time-consuming to plot as the figures were unrounded. Common errors on graphs were omission of title and units on the axes. The statistics questions were poorly answered. Stronger candidates used the correct method for calculating the mean from a grouped frequency table, although not all realised that the groups were not of equal size and used an incorrect mid-point for the final group. Many candidates showed uncertainty over the correct method to deal with grouped data; common errors seen were finding the total of the mid-points instead of the sum of fx , or dividing by the number of groups. Questions involving the interpretation of the results of statistical calculations were not often done well, although time pressure may have been a factor here. Most candidates attempting these questions made a comparison of averages from different years, but not all stated the implication of their comparison. Few candidates were able to describe the significance of the interquartile range successfully.

Recommendations to Centres

Centres must ensure that candidates:

- enter for the level 3 test when they are sufficiently prepared
- 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
- calculate the mean of grouped data
- solve problems involving construction and solution of simple equations
- 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
- follow the conventions used for graphical presentations, in particular titles, appropriate labelling and units.