

Application of Number Level 3 January 2005

General Comments

This paper was well balanced in terms of the skills listed in Part A of the level 3 standards. Questions varied in the demands they made of candidates; some were easily accessible, whereas others required more thought in understanding the problem, breaking it down into manageable steps and in the application of appropriate methods. A high proportion of candidates attempted all the questions, indicating that the overall length of the paper was not an issue, although some questions were quite wordy.

The pass mark for this paper was similar to previous series, but more candidates appeared to be better prepared, and the proportion of candidates achieving a pass was higher than in previous series.

The paper opened with a relatively straightforward group of questions involving calculations of time, distance and speed, which many candidates answered correctly. Other questions answered successfully involved using a formula, estimating a fraction, calculating using large numbers and calculating with a compound percentage. Questions involving calculation of volume, proportional difference, using a scale drawing, simultaneous equations and finding the mean of grouped data were handled well in general by stronger candidates, but others showed weaknesses in these areas.

Inappropriate rounding once again led to some candidates losing marks. Sometimes this was due to premature rounding part way through a multi-stage calculation leading to an inaccurate final result. In other cases, answers were not given to a sensible level of accuracy.

Comments on Particular Aspects of the Question Paper

The opening questions were answered well by many candidates. Errors were made by weaker candidates in using the speed, distance time equation, and confusing area with distance. A question involving the volume of a trapezium-based container was poorly answered, with many candidates failing to apply a correct method for finding the area of a trapezium. Where they found the area of the rectangle and two triangles, many candidates failed to calculate one dimension of the triangles accurately.

The second question involved use of a formula which was well handled by stronger candidates, but proved demanding for others, who found it difficult to evaluate the expression

$10000\left(\frac{1}{100-x}\right)$ given a value for x . The following part of this question was rarely

answered correctly. It required candidates to find the cost price of two items given their selling price and the percentage profit or loss. Many candidates failed to identify a correct method for solving this problem.

The following question about human energy expenditure was answered well, with candidates choosing correct values from a table to use in a multi-stage calculation. A question about the energy used in exercise was less well handled, the most common error being a misread of the question, which asked for the average daily energy use, whereas many candidates used the weekly values for part of the calculation.

Most candidates gained marks on a question about a charity airlifting supplies. The cost of fuel for a flight was found accurately, although some candidates had difficulty in converting a time in hours and minutes into minutes and others lost a mark through premature rounding. Many candidates accurately calculated the payload of an aircraft using a formula. Stronger candidates did the trigonometry question well, whereas others were either mistaken in their choice of function, unable to rearrange a formula correctly or attempted to use the inverse tangent to calculate the length of a side of the triangle.

A question about a survey of bluebells proved demanding for candidates. In converting dimensions of a patch of bluebells to metres to estimate its area, there was a tendency to find the area in the original units, then multiply by the conversion factor instead of converting the units first or using the square of the conversion factor. Candidates had difficulty in calculating the dimensions for a scale map of the patch, either choosing the incorrect operation or by failing to round results to a reasonable level of accuracy. The part of this question involving simultaneous equations was rarely completed. Few candidates successfully wrote two equations, although there were some who obtained the correct answers without giving the equations.

Most candidates gained some marks on parts of the extended question, notably those involving approximating a fraction, calculating with large numbers and a compounded percentage. Fewer than half the candidates found the correct mean of grouped data, a common error being to find the sum of the midpoints of the groups and divide by the number of groups. In the line graph, plotting of points was generally accurate, but too often the title, axis labels or units were missing or incorrect. A part question involving interpretation of the graph was not generally well handled. When asked to compare the trends shown, some candidates stated that one set of values was higher than the other, rather than commenting on the higher rate of increase. Candidates should note that when asked to make a numerical comparison between data sets, they should calculate a difference between values rather than simply quoting the values provided.

Recommendations to Centres

Centres must ensure that candidates:

- read questions carefully to extract all the relevant information and after finishing a question, check to see they have answered it fully
- practise breaking down complex problems into manageable steps
- choose suitable levels of accuracy and be guided by the data provided
- convert between units accurately, especially when dealing with area and volume
- calculate the mean of grouped data
- solve problems involving construction and solution of simple equations
- avoid premature rounding in multi-stage calculations
- follow the conventions used for graphical presentations, in particular titles, appropriate labelling and units

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