

Application of Number Level 3 March 2005

General Comments

This paper was lengthy and required candidates to read and understand some complex information in order to answer questions. Although balanced in terms of the skills coverage, the paper was uneven in the demands it made; the opening questions and the extended question were reasonably accessible whereas others, notably questions 2 and 5, will have required a good deal of time for candidates to understand the information given and plan a method for arriving at an answer. It was clear that some candidates were left with too little time to complete the final question, whereas those who opted to attempt the extended question first had the opportunity to gain marks on a more manageable question. The pass mark for this paper was lower than that in recent series, and the proportion of candidates achieving a pass was lower than previously.

Candidates in some centres performed poorly and appeared to have been entered either at the wrong level or before they were sufficiently prepared for the test.

The paper opened with a relatively straightforward questions involving calculation of amounts of calcium in food, which will have given an encouraging start to many candidates. Other questions answered successfully involved using a formula, estimating a fraction, and calculating with a compound percentage. Questions involving use of trigonometry and Pythagoras' theorem, proportional difference, using a scale drawing and simultaneous equations were handled well in general by stronger candidates, but others showed weaknesses in these areas. The questions that led to the weakest responses involved calculating a net price given the price including VAT, finding the mean of grouped data and interpreting statistical information including frequency polygons.

As in previous series there were numerous instances of candidates losing marks through incorrect rounding. Sometimes this was due to premature rounding part way through a multi-stage calculation leading to an inaccurate final result. In other cases, final answers were not given to a sensible level of accuracy.

Comments on Particular Aspects of the Question Paper

The opening questions were answered reasonably well, with candidates finding amounts of calcium in servings of food using percentages and proportion calculations to decide if a slimmer obtained the recommended daily amount. A common error involved omission from one stage of the calculation or one amount given in the question.

The second question concerned a ramp for wheelchair access to a building. Although many candidates correctly chose to use the tangent of the angle given, errors in rearrangement of the formula were frequently seen, with some candidates moving from

$\tan 4^\circ = \frac{180}{D}$ to $D = 180 \times \tan 4^\circ$, or using $\tan^{-1} 4^\circ$ instead of $\tan 4^\circ$. Others lost marks

through incorrect rounding, giving an answer in millimetres to two decimal places. The following part questions about the length of handrails on the ramp were poorly answered, with many candidates misinterpreting the information given in the question, and calculating the length including one 300mm extension instead of two.

A question involving use of a formula to find the capacity of a plant pot was well handled by stronger candidates. Common errors were to confuse of the diameter of the pot with the radius, omission of the division by 3 required in the formula and interpreting the expression Rr as $R + r$. Many candidates identified the correct method for the second part of this question, but not all completed it successfully, as they did not know how to convert between cubic centimetres and litres.

The following question about age distribution of the UK population proved challenging . Many candidates correctly estimated a fraction, but some gave their answer as a percentage, while others failed to simplify their fraction fully or used the wrong value as the denominator through misreading the question. Few candidates made valid comparisons of age distributions shown in frequency polygons as they related to a particular age rather than an interval or compared numbers in one age interval instead of comparing the whole distribution. Finding the mean age from a grouped frequency table was poorly done with very few candidates using the correct mid-points and many showing little awareness of the correct method.

A question about pensions was poorly answered. The first part involved a compounded percentage increase, which some candidates did successfully. Others calculated the increased pension after one year rather than three, perhaps through misreading the information given. Subsequent parts of this question, about the overall cost of pension increases, were rarely correctly answered. Candidates attempted the multi-stage calculation required, but failed to use a complete method, or made calculation errors with the large numbers involved. Some candidates did not seem to know the number of days in a year.

Most candidates who attempted the extended question gained some marks, although many did not complete all the parts. The first part involved conversion from feet and inches to metres to find the area of a dog kennel and a fair proportion of candidates gained at least two marks out of the three available. Others did the conversion incorrectly by treating 4 feet 6 inches as 4.6 feet, or by rounding prematurely. Some found the area in square feet then applied the conversion factor once instead of converting the dimensions first. Few candidates wrote correct equations in the algebra question, although some found the correct solution using other methods. In the line graph, plotting of points was generally accurate, but too often the title, axis labels or units were missing or incorrect, or candidates chose an inappropriate scale.

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
- interpret graphs and charts and compare distributions accurately
- 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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