

KEY SKILLS APPLICATION OF NUMBER (MARCH SERIES) 2005

Chief Examiner's Report

Level 1

This paper was of a similar level of difficulty to recent papers, allowing a fair test of candidates' knowledge and skills at Level 1. There were many candidates who performed well in this paper.

Questions where candidates performed well include:

- Interpreting information from simple tables and charts.
- Questions changing from numbers to words and vice versa.
- Reading simple scales/dials.
- Candidates performed better in this paper in using scaling ratios for diagrams, and working with simple fractions.
- They tend to like questions about money.
- Candidates performed well in questions asking them to round to given accuracy.

Some problems were evident:

- There continue to be a substantial number of candidates showing problems finding mean and range.
- Finding volume of a cuboid and area of a rectangle.
- While candidates could use simple fractions like $\frac{2}{5}$ or 75%, they were less confident in finding 1% of a price.
- Questions are set requiring candidates to understand an arithmetic expression which shows how an answer may be obtained. They usually find this difficult; in this paper, they had particular difficulty in a question that gave information in pence, and wanted an expression in pounds. Another question asked for the expression to calculate a VAT payment.

Level 2

The Chief Examiners felt that there were a large number of 'hard' questions on this paper, though the overall difficulty was similar to recent papers. As in the Level 3 paper described below, we continue to see weak responses from Application of Number candidates in topic areas that have been mentioned before. This is particularly true in questions requiring more than one step, where the candidate must choose the calculations and their order.

Questions from the following topics caused difficulty to the majority of candidates.

- Various calculations about percentage - including finding one number as a percentage of another.
- Estimating an answer.
- Change of units (from a centimetre scale to metres).

- Statistical calculation – Level 2 candidates performed worse than Level 1 candidates in finding range – the calculations themselves were simple. Many did not seem to understand ‘median’. Calculating the mean to compare two sets of data was also poor. Candidates at Level 2 should expect to **compare** statistics.
- Area (a ω shape) and volume.
- Substitution into formulae.
- Many had problems applying ratio or proportion.
- Candidates performed badly when asked to round a calculator display to the nearest £10.
- Interpreting and using scale drawings.

There were good responses to some questions involving:

- finding a mistake in a chart;
- interpretation of tables;
- reading scales/dials – but candidates need experience with a wide variety of scales, not just with units or 10s.

Level 3

Examiners felt that this paper shared the problems of some earlier papers. The information presented throughout was complex, and the paper was consequently difficult for candidates to complete in the time allocated. However it must be emphasised again that reading and interpreting complex information is one of the Level 3 skills.

The cohort for the March 2005 examination was relatively small, and did not reflect the usual range of abilities entered as Level 3 candidates. They exhibited many weaknesses in their knowledge and use of Number skills. Many students were not prepared with the knowledge and techniques required. (All of these skills have been mentioned often before eg mean from a grouped frequency table, using trigonometry and Pythagoras). Hence many in this candidate group were unable to get ‘into’ a question because the basic number facts or techniques seemed to be unknown to them. More of these facts and techniques are identified below.

Some issues specific to this paper:

- Q.1 In this question, examiners did not focus on the issue of sensible rounding of final answers – there are not enough marks allocated for this – but candidates should be encouraged to give appropriate accuracy for the context.
- (a) Many candidates struggled with the reverse percentage (from 67.23% to 100%).
 - (b) As in many parts of this paper, applying simple proportion was poorly done.
 - (c) This required a series of fairly simple steps; candidates would help themselves if they showed the steps!
- Q.2 Examiners felt that the diagram was not well drawn and potentially unhelpful; however this was not evident in candidate responses. The main problem shown by this group of candidates was in the knowledge and application of trigonometry. Some centres’ candidates seemed to be unaware that this knowledge was required.

Most candidates who used inverse trigonometry notation had no idea what it means.

- (a) Answers needed to reflect the accuracy used in the given measurements.
- (c) ie If trigonometry was used in (b), either a different trig. ratio or Pythagoras should be used to check; if Pythagoras was used in (b), then a trig. method is required to check.

- Q.3
- (a) Few candidates successfully substituted and evaluated this formula.
 - (b) Many candidates ignored the units required; of those who tried to change units, too many do not know the relationship between cm^3 and litres.
 - (c) This was a simple practical problem, which a substantial number of candidates completed.

- Q.4
- (a) Candidates need to understand the concept behind an attempt to give an ‘approximate fraction’ to summarise a data comparison.
 - (b) Hardly any candidates (nationally) understood that this is not a line graph ie not about points. To understand and comment, the candidate needs to consider the intervals (as in the table on the opposite page) represented by the points. It is possible to interpret the increase in ‘average’ from the graph, but other comments need to relate to the class boundaries rather than the midpoints plotted.
 - (c) Mean from a frequency table should be a ‘standard’ technique – some centres had few if any candidates with correct methods. One would have thought that candidates would realise that a mean age of 10 years in 2025 would be unlikely.
 - As this is age, the classes run from 0 to 15th birthday, 15th to 30th birthday etc. so the mid-points should be at 7.5, 22.5 etc rather than 7, 15, etc. so the correct answer is 43.4 years.
 - (d) The ratio (like the fraction in (a)) needs to be in its simplest form.
 - (e) This also involves interpretation (see 3.3 in standards), where generally candidates are poor. Ideally one would expect a comment identifying the change in mean age (preferably with a figure) and the increased proportion of males in the 75 – 89 age category so using their answers to (c) and (d). The latter requires an understanding of the ratios, and possibly some common notation to allow for comparison (either percentage or ratio as 1 : n?)

- Q.5
- (a) Repeated percentage change is a common question in these papers. Hence you have had this advice before – you are recommended to teach percentage change as multiplication by a factor.
 - (b) Many (perhaps understandably?) found this part confusing. Firstly it involves bringing together information from different sources in the question. Secondly

it involves several stages to reach the final solution. There are many routes through the question. In awarding the part mark, we have tried to recognise substantial progress on any of these.

- (c) This seemed fairly straightforward – yet few candidates worked well with the data.
- Q.6 (a) A substantial number of candidates treated 4ft 9in as 4.9 feet. Perhaps this type of conversion needs to be addressed in class (in both directions?). Similar issues arise with other non-metric units, especially time.
- (b) Most candidates ignored the need to round up.
- (c) This is another example of a Level 3 question using simple proportion where the candidates have used data poorly.
- (d) If percentage change is learned as a product then ‘reverse percentage’ becomes division. I would expect candidates to have practised the removal of VAT as a standard division by 1.175. Almost all of this group were attempting a subtraction.
- (e) and (f) These equations should be easy to set up and solve if candidates are prepared.
- (g) Many basic errors:
- graphs should have a meaningful title;
 - scales should be labelled and units included where needed;
 - the axes should have the correct orientation – in this case the cost depends on the number of dogs;
 - scales need to allow for answering the question; in this question, the prediction for 24 indicates a need to extend BOTH scales beyond the values in the table;
 - some candidates chose awkward scales; this is to be discouraged as it frequently leads to plotting mistakes. Some graphs were tiny, as the scale had been started at 0.
- (h) The line of best fit does not pass through the ‘origin’.
- (i) Examiners will not give credit for an answer from a graph if there is no graph or if the graph does not extend to permit an answer.
- (j) The assumption behind extrapolation in a scatter graph is not ‘As one goes up the other goes up’; it is about the rate of increase or words to that effect, like ‘continuing the trend’

KEY SKILLS APPLICATION OF NUMBER 2005
(APRIL MODERATION - comprising November 2004, January 2005 and March 2005)

Principal Moderator's Report

General Comments

Portfolios were submitted by a number of centres at Level 1, 2. All of the centres were accredited.

Task setting

- The activities chosen came from a variety of subject areas, providing candidates with adequate opportunities to generate sufficient, appropriate evidence for the level of entry.
- Portfolios were generally well presented.

Fulfilment of Standards

Level 1

- The majority of portfolios had appropriate source material to allow the generation of sufficient evidence.
- Some portfolios did not contain sufficient calculation evidence for all the required categories of N1.2
- Some of the sample portfolios did not have the required two different methods of presentation using charts and/or diagrams for N1.3. A number did not adequately describe their results and relate their findings to the purpose of the activity.

Level 2

- The majority of portfolios had adequate source materials to generate the appropriate evidence. Some portfolios did not have the required material containing a graph.
- A number of portfolios had insufficient calculation evidence for all the required categories for N2.2
- Some portfolios did not have the required two different methods of presentation from charts and/or graphs and/or diagrams to meet N2.3. A number of candidates did not adequately explain how their results and findings related to the purpose of the activity.

Annotation

- Some centres did not fulfil the requirements for annotation. Centres are reminded that evidence needs to be annotated to indicate the standards being claimed.
- Sources should be clearly labelled to distinguish them from generated evidence.

Centres are reminded that level 2 candidates must ensure that they use some source material containing a graph or a chart.

- To demonstrate understanding of the processes, all charts, graphs and diagrams should be adequately and accurately labelled and interpreted, particularly when they are produced using IT.

Many candidates submitted well-organised portfolios. The best examples indicated the location of each piece of evidence by page reference, which facilitated the easy location of the claimed evidence.

Desktop Task

The purpose of the Desktop Task is to confirm the portfolio level. The Desktop Tasks submitted were of a good quality and have proved to be a meaningful, 'fit for purpose' assessment instrument.

Centres are advised to plan their learning programme to allow sufficient time to carry out the Desktop Task