

# THINKING SKILLS

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Paper 9694/21  
Critical Thinking

## Key messages

Teachers and candidates should use old mark schemes and Principal Examiner's Reports in order to familiarise themselves with the types of answers expected to types of question which frequently occur. For example, candidates need to know what questions about the "reliability" of evidence mean (as in **Question 1a**) and the kind of answer which should be given. Similarly, they should know the technical meaning of the word "argument", which occurred in **Question 2a**.

Candidates should cultivate an attitude of scepticism towards sources, both in the exam and in ordinary life. For example, in **Question 1** many candidates took it as fact that Charlie's only objection to Jane was that she would not allow him to eat chips, but Jane herself is the only source for that information, and she has reasons to misrepresent the situation in order to protect herself: so it is wrong to accept her claim without reservation.

## General comments

Most candidates had time to attempt all questions, but a significant minority omitted one or more part-questions. A few candidates omitted much of the exam, probably because they did not understand what they were expected to do. It is a bad strategy to omit **Question 3d**, as some candidates did, and those who answered **3d** before **3c** when they might have been at risk of running out of time made a wise choice, since candidates are generally less successful on **3c**.

## Comments on specific questions

### Question 1

Nearly all candidates understood the issue and the implications of the sources.

- (a) Both halves of this question were done quite poorly, apparently because most candidates did not understand what "a factor that reduces the reliability" meant, even though questions about reliability occur in almost every paper.
- (b) Many candidates achieved full marks on this question. Many correctly observed that Jane's own description of her behaviour contravened the definition of bullying given in Source B, but there were also other ways of achieving the marks.
- (c) Many candidates achieved 2 or 3 marks out of 3 on this question, by judging that the memo responded very badly to the allegation made against Jane, because instead of attempting to answer the criticism she attacked the person who made it. However, a significant minority judged that counter-attack was an effective way of responding to the allegation; this judgement was not credited.
- (d) Most candidates judged that Jane did bully patients and staff at the Ropewalk Care Home, but some thought she was tightening up on standards in an appropriate way. Both judgments were, of course, equally acceptable. A good proportion of candidates identified a viable alternative to their preferred conclusion, and there was some good evaluation of sources and inferential reasoning. As usual, however, quite a lot of candidates did no more than make a judgement and support it by simple reference to the sources, which achieved 2 or 3 marks out of 6.

## Question 2

Candidates appeared to have no difficulty in understanding this issue.

- (a) Not very many candidates achieved 2 marks out of 2 on this question. Some apparently interpreted the key word “argument” in its everyday sense, instead of recognising it as a technical term in Critical Thinking. Some of those who did know the specialised meaning of the word thought that Source A was not an argument, while others achieved 1 mark by correctly claiming that it consisted of a conclusion supported by reasons (or premises), but identifying the wrong clause as the conclusion. A few candidates achieved 2 marks by making the right judgement and correctly identifying the conclusion.
- (b) Nearly all candidates correctly identified the correlation in Source B between the level of education achieved and the degree of satisfaction with respondents’ health, and many rightly pointed out that being satisfied with one’s health is not the same thing as being healthy.
- (c) A lot of the answers given to this question were not credited because they were versions of the explanation in Source D instead of “other explanations”, but a fair number of candidates correctly identified implications in relation to health of the link between education and income or employment or between income and access to education.
- (d) Most candidates argued in support of the claim, while a fair number achieved an additional mark by offering a nuanced conclusion. Some candidates made good use of personal thinking together with their discussion of the sources, but a few relied solely on personal thinking and ignored the sources, which severely limited the marks available to them. Most candidates thought that the increase in life expectancy mentioned in Source A was very significant, and few if any commented that it was actually very small.

## Question 3

Candidates tended to find the passage quite difficult, mainly because they thought it contradicted itself.

- (a) A fair number of candidates correctly identified the main conclusion, although others identified the first sentence as the main conclusion and a few other wrong answers were also given. A few candidates offered a précis of the passage instead of identifying the main conclusion.
- (b) A fair number of candidates correctly identified 2 or 3 intermediate conclusions, but many wrong answers were also given.
- (c) A fair proportion of candidates understood what was expected by this question, and gave at least one correct answer, although as in previous series some still argued against the reasoning instead of evaluating it. Some candidates wasted time attempting to identify and explain strengths in the reasoning, even though the question made it clear that the overall strength should be assessed by identifying “flaws, unstated assumptions and other weaknesses”. Some candidates correctly identified significant unstated assumptions, but many still wrongly interpreted the expression “unstated assumptions” as meaning “unsupported statements”. The most popular correct answers identifying flaws were the exaggerated generalisation at the end of paragraph 1 and the slippery slope argument at the end of paragraph 2. Some candidates correctly named or explained the *argumentum ad hominem* in paragraph 3. A popular wrong answer was that the passage was self-contradictory, because it began by claiming that people should normally not tell lies but went on to identify the circumstances in which lying was justified. As on previous occasions, marks were not awarded for criticisms of the argument for being one-sided, for expressing the opinion of the implied author, or for lacking statistical support.
- (d) This question was done less well than usual. The claim used in **Question 3d** is always related to the passage, but not on exactly the same topic. On this occasion, most candidates discussed lying instead of “moral problems”: they were awarded some marks if they made it clear that the prohibition of lying was an example of a moral principle, but a significant number of candidates were given 0 marks for this question because they discussed lying instead of moral principles; some explicitly discussed the reasoning in the passage, which was not what they were asked to do.

# THINKING SKILLS

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Paper 9694/22  
Critical Thinking

## General comments

Candidates seemed to respond well to the issues raised by the questions and were able to tackle them effectively. There was a continuation of the trend for the majority of candidates showing an understanding of the nature of the examination. Such candidates realised that expressing opinions about the issues raised or showing further knowledge was not the key focus. However, there is still a minority of candidates who seem unprepared and struggle to reach a total mark in double figures.

## Key messages

- In questions such as **1b**, candidates must focus on the particular piece of evidence that is quoted in the question rather than the source as a whole.
- Candidates should provide a clear conclusion in questions that ask for this (usually, **1d**, **2d** and **3d**. In **3d** in particular, candidates missed out on marks by simply reviewing both sides of the issue and not reaching a clear conclusion. Confusion about this issue is sometimes revealed when candidates criticise the argument in **Question 3** for not looking at both sides. Of course, counter-argument, where a possible objection is raised *and then rejected through reasoning* is to be welcomed.

## Comments on specific questions

### Question 1

- (a) A reasonable number of candidates saw that whilst suspicious and something that needed explaining, in itself, the email could not be used to show that Bland had been insider trading. Some candidates leapt straight to this point and the judgement 'not significant' was allowed. Candidates who said the email was definite evidence for insider trading did not score.
- (b) As mentioned in the 'key messages', many candidates did not focus on the issue of many shares being sold as evidence that could support Bland's defence and focused on the source as a whole, particularly the point that there had been an article recommending selling. Very few candidates made the points that the large number could have all been Bland's shares or also the result of insider trading. A number of candidates did manage to score 2 marks via the relatively easy route of focussing on the lawyer's vested interest to defend Bland, meaning the evidence was not useful.
- (c) Very few candidates moved beyond the point that Source E suggested his moral character meant that he may well have been capable of insider trading. Some candidates simply repeated the points about his character without relating them to insider trading and were not credited. A large number suggested the relevance was reduced because some years had elapsed, but this point was not credited.
- (d) Clear conclusions were reached in the majority of cases, although, as mentioned in the 'key messages', some candidates hedged their bets. Answers were split reasonably evenly between those who considered him guilty and those who considered him not guilty. Most answers reviewed the evidence for and against without much in the way of further reasoning, though opportunities for this may have been, arguably, somewhat more difficult to take than in previous topics. Very few, if any, candidates explored the idea that because selling the shares the day before the collapse was so suspicious, a true inside trader would have avoided this by selling them a few days before.

## Question 2

Candidates did well on this question in comparison with some previous topics. However, whilst all three of the short questions produced a good number of 2 or 3 mark answers, few candidates managed to consistently achieve this score across all three.

- (a) Most candidates got the right focus in this question, though not many managed to get three reasons why the comparison might be considered invalid. Some candidates evaluated the credibility of the source but this was not what was required.
- (b) An encouraging number of candidates saw that this did not respond to the points made in Source B and made interesting and relevant comments, for example, that improved vision after the operation was perfectly consistent with the point Source B makes about the danger of contact sports. There was a good number of 3 mark answers.
- (c) Many candidates came up with two acceptable explanations but very few managed to successfully outline why these explanations would be used. The point being looked for is that they all deflect blame away from the actual procedure.
- (d) Candidates managed to answer this question reasonably successfully, with effective evaluation of the sources and inference from them in the best answers. Nuanced conclusions were quite common, with two routes to this, either that it was risky but should not necessarily be avoided or that it was not risky if done by competent doctors on eligible patients.

## Question 3

- (a) There was a reasonable range of answers, though 1 mark answers were in the minority. A significant number of candidates crossed out the correct answer and substituted the final intermediate conclusion, possibly because it was the final line of the passage.
- (b) A good proportion of candidates managed to identify three intermediate conclusions with 'sport brings economic benefits' being the most readily identified.
- (c) Candidates often found the evaluation difficult and there were a fair proportion of answers between 0 and 2. Paragraph 2 tended to encourage challenges to the statements rather than evaluation of the reasoning, but better answers managed to see the inconsistency with what is said in Paragraph 4. This was the most common successful evaluative point. Many candidates saw that there was a problem with moving from 'the population would be healthier' to 'spending on health would be kept under control' but few if any, saw the flaw of confusing a necessary with a sufficient condition. As in previous examinations, some answers deployed the right terminology for flaws but did not apply it correctly.
- (d) Arguments were evenly split between for and against the proposition. Arguments often focused on people playing sport rather than the 'sport industry' as such but this did not prove much of a problem. As stated in the 'key messages', candidates should take a clear position either for or against and, if opposing viewpoints are introduced they must become the basis of counter-arguments if they are going to enhance rather than detract from the argument they are presenting.

# THINKING SKILLS

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Paper 9694/23  
Critical Thinking

## Key messages

Teachers and students should use old mark schemes and Principal Examiner's Reports in order to familiarise themselves with the types of answers expected to types of question which frequently occur.

## General comments

Most candidates had time to attempt all questions, and the few omissions were probably either accidental or because candidates did not know how to answer the question.

## Comments on specific questions

### Question 1

Nearly all candidates understood the issue and the implications of the sources.

- (a) Most candidates realised that the additional information contradicted Professor Eno's claim about his son's experience "managing arts events", although a few thought it supported the claim. A good number of candidates drew an inference from this observation, connected with Professor Eno's credibility or vested interest in favour of his children, but not many gained the full 3 marks.
- (b) Some candidates judged that statements from lawyers are reliable because of their professional status, which was not credited, but most realised that lawyers act as the agents of their clients and in those circumstances say whatever they are instructed to say.
- (c) Most candidates suggested that Professor Eno hoped that Mr Devi would resign or be dismissed and that he would then be appointed in his place, which was an acceptable answer. Some candidates repeated or commented on the explanation given in the question, ignoring the important adjective "other" in the question.
- (d) Most candidates judged that BE and his family did defraud the university. Not many identified a plausible alternative to their preferred conclusion, but some unlikely alternatives were offered, especially that Mr Devi defrauded the university: these were not credited. There was some good evaluation of sources and inferential reasoning. As usual, however, quite a lot of candidates did no more than make a judgement and support it by simple reference to the sources, thereby achieving 2 or 3 marks out of 6. Many candidates treated the allegation of theft against Mr Devi more seriously than it deserved, but others rightly interpreted it as evidence that Professor Eno wanted to prevent scrutiny of the financial records of the Heritage Tour.

### Question 2

Candidates appeared to understand the basic idea that nutrition affects height, but many seemed to find it difficult to grasp how that process worked, in particular that it took a long time to become apparent.

- (a) Most candidates achieved 1 mark, by commenting that Source B refers to "junk food", but not many drew any inferences from that observation in order to gain the other 3 marks available. Some candidates thought that the different time periods could have made a difference in the effect of food, but this was not plausible enough to be credited.

- (b) Some candidates rightly pointed out that both nutrition and genetics influence height, but few if any drew the distinction between individuals and populations. Instead of assessing the student's comment as an "objection to the claims in Sources A, B and C", most candidates explained that it did not say the same as those sources: answers of this type were not credited.
- (c) This question was not done well, mainly because most candidates overlooked the importance of the word "recruits" and thereby did not realise that the question refers to health records taken on entry to the armed forces. The most popular answers were reasons why members of the armed forces might be fed better or worse than the population in general, which missed the point. Some candidates suggested reasons why particular nationalities might be taller or shorter than others, which also missed the point.
- (d) Most candidates argued in support of the claim, but a good proportion gained an additional mark by offering a nuanced conclusion. Many candidates scored 3 marks out of 6 by simply using 3 or 4 sources to support their conclusion without evaluating sources or drawing inferences. Some candidates made a creative connection between Sources A and D, in order to show that Source D supports the claim; however, they tended to explain the drop in average height during World War II as due to the shortage of food during wartime, rather than the relaxation of physical standards for recruitment, which suggested that they did not understand the gradual nature of the effect of nutrition on height.

### Question 3

This topic seemed very accessible and candidates engaged with it well.

- (a) Most candidates correctly identified the main conclusion, although a few wrong answers were given.
- (b) A fair number of candidates correctly identified 2 or 3 intermediate conclusions, but many wrong answers were also given.
- (c) A fair proportion of candidates understood what was expected by this question, and gave at least one correct answer, although as in previous sessions some still argued against the reasoning instead of evaluating it. Some candidates wasted time attempting to identify and explain strengths in the reasoning, even though the question made it clear that the overall strength should be assessed by identifying "flaws, unstated assumptions and other weaknesses". Some candidates correctly identified significant unstated assumptions, but many still wrongly interpreted the expression "unstated assumptions" as meaning "unsupported statements". A good number of candidates rightly questioned the conflation and appeal to tradition in paragraph 1 and correctly identified the weak support given to the IC of paragraph 4 by the discussions of toxoplasmosis and fleas. Quite a lot of candidates spotted the straw man in paragraph 3, but nearly all of them wrongly identified it as an *argumentum ad hominem*, thereby gaining only 1 mark instead of 2. As on previous occasions, marks were not awarded for criticisms of the argument for being one-sided, for expressing the opinion of the implied author, or for lacking statistical support. Quite a lot of candidates criticised the implied author for being biased against dogs, which was not an evaluation of the reasoning and was therefore not credited.
- (d) Candidates responded well to this question, most choosing to challenge the claim. Many made good use of appropriate examples and organised their arguments in strands of reasoning. A few candidates misleadingly conflated working animals with pets.



# THINKING SKILLS

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<p>Paper 9694/31 Problem Analysis and Solution</p>
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## Key messages

Candidates must prioritise the labelling of their working if they are to gain partial credit on the more complex questions. When working is being written down it may be unclear to the candidate whether it is relevant or offering progress, and is likely to be completed in haste: this is why candidates must try to cultivate habits in their preparation for the assessment (such as including units, offering brief words to state what values they are listing or combining, underlining answers), which they can fall back on when under exam conditions.

## General comments

Candidates found **Question 4** the easiest, and **Question 3** the hardest, as is often the case, but only a few appeared to tackle the questions in an order that reflected the perceived difficulty. Two of the questions involved the finding of sums and differences of times, and a number of candidates did this thoughtlessly, treating minutes as if they were decimals. Only two of the questions explicitly asked for explanations, and these were both tackled competently by most candidates.

## Comments on specific questions

### Question 1

This question required candidates to work with a number of interrelated rates (grams lost per minute on different routes, and with different products, as well as grams sold per dollar) as aspects of the scenario changed. Certain aspects remained constant throughout the question (such as the choice of the two routes), and certain aspects changed (such as the insulation of the box, and the quality of the ice-cream). All candidates attempted the question, and most had success with parts **(a)**, **(b)** and **(c)**, but the last two parts were found challenging.

- (a)** The comparison of the two times and rates was fairly straightforward. A small number of candidates offered an appropriate calculation ( $20 \times 25 = 500$ ) but no judgement on which route this involved.
- (b)** This required a revision of the calculations (for the new times and the new rates of loss), and finding the difference between them. Those who laid out the four options on the page completed the task correctly.
- (c)** Most candidates were able to make the initial comparison – \$15 is 9000 g of ice-cream – and use their answer to **(b)** to convert this into days. But many struggled with the conversion into weeks – either by just forgetting to do it at all, or by using 7-day weeks.
- (d)** The combination of rates (grams lost per minute and grams sold per dollar) made this part substantially harder than the previous three, and few candidates managed it correctly. Those who did attempt the question tended to convert the bus fare into grams of ice cream ( $\$0.80 = 480$  g of ice-cream).
- (e)** Many of those who struggled on part **(d)** did not attempt **(e)**, although the problems were independent. There were a number of different ways of tackling the problem, and many candidates approached a solution using trial and improvement – but few scored any marks, because the working was not labelled clearly enough to follow.

## Question 2

This question involved the interaction of time zones, flight times and the application of Daylight Saving Time (DST) adjustments. The tracking of when flights arrived and departed, in local time, was made more complex by the need to amend the times in the right direction, and by the sensitivity needed with the arithmetic of hours and minutes.

- (a) This part was not affected by incorrectly directed DST adjustments (there were 5 distinct zones whether you added or subtracted the hour), but it did require their application. Most candidates accomplished this correctly.
- (b) This part required the application of a time zone adjustment, and a Daylight Saving adjustment, correctly applied to the times and dates. Only some of the candidates did this correctly. The most common error was to apply the DST adjustment in the wrong direction.
- (c) This part required similar processing and similar discriminations to part (b) and caused similar difficulties. Those who applied the DST adjustment in the wrong direction were able to score partial credit here.
- (d)(i) Few candidates clearly offered the key dates (for the beginning and end of the DST periods in New South Wales and London) and very few managed to identify the correct number of days. Many candidates appeared to attempt this 'mentally' or lay out their working elsewhere. In this case, where there are clear-cut stages needed to achieve the overall solution (such as finding out the date of 'the last Sunday in March'), candidates are encouraged to lay these out with labels – brief references to what any calculation/number means in the context of the question.
- (ii) This part required candidates to build on their method from (i). As a result it was accomplished successfully by very few.
- (e) This final part returned to the issues of (a)–(c), but added the complexity of multiple flights and stopovers. However, no new judgements were needed to reach a correct answer, just precise and careful tracking of all the assembled parts. Most candidates did leave traces of their working for this question, but without labels, and thus rarely earning partial credit.

## Question 3

This question required candidates to use data (the number of cars parked in company car parks), and certain predefined ratios, to predict the number of employees working for a company. Correct navigation through the question required sensitivity to the use of averages, the different types of worker, the ratio between the number of cars and the number of people, and the ratio between the number of people working on a particular day and the total numbers of staff. It was easy to omit or mis-apply these different elements and very few candidates accomplished the entire question correctly.

- (a)(i) This part invited candidates to combine the information about the shifts with the data about the car park – and infer that the cars in the car park at midnight included shift-workers from both the 16:00 to midnight shift and the midnight to 08:00 shift. Fewer than half the candidates managed this.
- (ii) Candidates were expected to appreciate that the minor variations between the number of shift-workers' cars was only really explicable by people leaving early/arriving late, and that the maximum value was the 'best estimate'.
- (iii) This required candidates to appreciate that the car park at 10:00 included shift-workers' cars (which needed to be deducted from the total), to remember that the non-shift-workers' cars included 1.1 people on average, and to make a sensible judgement with regard to the variation between the three days. It was the 1.1 non-shift-workers per car that caused the most problems here.
- (b) There were a number of viable answers here, and many candidates offered at least one mark-worthy assumption. The most common incorrect answers were too vague, e.g. 'the number of shift-workers varies'.



- (c) (i) Most candidates had difficulty assembling the appropriate pieces of relevant information when answering this question: the fact that the total staff figure could be split into the number of shiftworkers and non-shiftworkers, and therefore that the number of one of these groups could be used to find the other, was rarely appreciated.
- (ii) Without a reasonable answer to (i) this part was impossible. Follow through marks were available for candidates that clearly used their answer to (c)(i). Quite a few candidates who did this forgot to apply the '1.1 occupants' rule, and scored no marks here.
- (d) This part required a careful assembly of the ratio gathered from (c) and the CIA, to fill in the missing details for the NSA. A few candidates were awarded partial credit here, but many left their (often complicated) working without labels and no marks could be awarded. When so much of the answer depends on previous calculations, it is highly recommended that candidates offer brief notes regarding what is taking place in their calculations.

#### Question 4

This question involved the interaction of two data sources – one pertaining to the 'vital statistics' of certain songs, and one pertaining to their permutations in performances. Most of the questions involved directed tasks, in which there was little need for candidates to experiment with strategies or devise methods of attack. Almost all candidates performed well on this question, compared to their responses to **Questions 1–3**.

- (a) Most candidates were able to limit their search to the Number Ones, and identify *The Last Straw* as the longest song.
- (b) The comparison of the total number of weeks that songs were in the Top Ten for each year was accomplished well by most candidates.
- (c) Success at this part required appreciation that only *History* and *Water* could have reached Number 2 – and that 8 of the weeks were spent at Number 1. Many candidates underestimated the subtlety of this question and offered the answer 23.
- (d) (i) The elimination of all the songs used in the first three nights of the tour from the initial list was achieved by almost all candidates.
- (ii) As with (d)(i) this required careful elimination of those cases satisfying the given criteria – most candidates managed this successfully.
- (e) This sum of all the times of the songs used on the 9th night was attempted by almost all candidates: the most common error was to treat the times as if they were decimal numbers (e.g. to conclude that  $3:50 + 4:30 = 7:80$ ).
- (f) (i) There were five possible rules to infringe – and no marks were given for simply selecting two of these without explicitly stating which songs were the culprits. As a result, quite a few candidates did not score full marks here.
- (ii) Many of the successful candidates began by explicitly listing those songs which were necessary and those not eligible for the 10th night. Songs could then be selected for the remaining three slots, avoiding any from the same year, and the timings checked. This was completed well by about half the candidates.

# THINKING SKILLS

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<p><b>Paper 9694/32</b> <b>Problem Analysis and Solution</b></p>
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## Key messages

There has been an improvement in the approach taken by candidates in presenting work, with very little time-wasting or crossing out, but some candidates would have gained more marks if they had checked that their work offers a plausible answer and had checked for arithmetic errors, particularly when dealing with times.

## General comments

Since many candidates make arithmetic errors, not just with hours and minutes, for all parts of questions where there is more than one mark they should show their working to be able to gain partial credit, even where not explicitly required to do so for full marks. The numbers of marks for part questions are given, and candidates should be aware that multiple steps and considerably more time and effort can be expected for a three- or four-mark answer than for a single mark. Inappropriate dimensions, such as people per square second, are often a sign of error that candidates could notice and review what they have done.

Some able candidates appear to have spent too long on parts which they found hard, rather than leaving space and coming back for a fresh attempt after doing later questions.

## Comments on specific questions

### Question 1

This question explored a range of times and fares for a taxi driver on a simple route. In exploring maxima and minima it was essential to distinguish what was under the driver's control and what was not. Good responses avoided the use of 'min' for both minute and minimum.

- (a) Many candidates calculated a total, but only a few took care about the latest time he could depart from his home base and get back before the end of the shift, which is determined by taking the worst case for the traffic.
- (b) This involved finding a minimum (i.e. greatest certain) amount, again taking into account the latest time he could leave on his last journey. Better responses distinguished this question from one that might have been asked about the greatest possible income.
- (c) The maximum possible fare was wanted in this part. As the charging was for each 3 minutes or part thereof, the mark here required rounding up to a multiple of 3 minutes.
- (d)(i) This part introduced a requirement for a longer break. Better responses observed that there was only one break – long or short, but not both – in between journeys and did not add an unnecessary break at the end of the day.
  - (ii) This part looked at the extreme cases and the differences in income between them. Better responses included or excluded all relevant factors to determine the extreme cases.

## Question 2

This question involved packing identical boxes in a room. It was necessary to show that it could be done with boxes of the given dimensions, and not just that the total volume of the room was sufficient.

- (a) The number of boxes that would fit in a given orientation was asked for. Better responses noted that whole numbers were inherent in this question and that rounding is inappropriate in this context.
- (b) This asked for the maximum number of boxes all in the same orientation. To be sure of full marks, all orientations should have been checked systematically.
- (c) A number of boxes, less than the maximum possible, but more than can be done using only one orientation, was asked for. Better responses sought to find an efficient way to handle the side whose length was not a multiple of any of the dimensions.
- (d) This part asked for a way to pack a given number of larger boxes, if possible. It is possible, using three different orientations. Few candidates went beyond what could be done with two orientations, although one candidate provided a much clearer and simpler layout than was expected.

## Question 3

This question involved a model of a queue of people wanting to buy tickets by telephone. The person using it has one curious but clear simplification: she always starts a call on an exact minute. Ignoring this feature led some candidates to expend considerable time and effort to get to wrong answers.

Some candidates introduced complexity and often errors by looking at when a person would be the first one waiting rather than the person being served.

- (a) Better responses calculated and gave a time of day in response to the question 'when' rather than something relative to an unspecified point in time.
- (b) The same process as used in part (a) was repeated until after a specified time. Candidates need to remember that there are only 60 minutes in an hour.
- (c) This part asked to show a result. Any candidates who did not get to the given answer had the opportunity to check what they had missed before tackling the more complicated later parts. As the end result was given, the marks were for the working, not copying out final figure. Many who could not do this part skipped the rest of this question and went on to **Question 4**.
- (d)(i) This asked for the time to start to queue and the precise time of being served. Many candidates omitted to write down the precise end time, and some missed the point by rounding it.
- (ii) This asked for the latest start time, which was not simply five minutes after the previous answer, although that would be a sound starting point for trial and improvement. Once again, the arrival time was asked for, but seldom included.
- (e)(i) This part asked for the rate. This is a case where a check of the dimensions would have helped to detect wrong answers. It is also usually simplest to use the units as they appear in the question, e.g. minutes or cm. If candidates are trained or prefer to use another system, such as SI units, they should take care both with the conversion and with handling rounding.
- (ii) This part looked at whether she would be able to buy a discounted ticket before the supply ran out. Only a few candidates took account of the different queue lengths for each iteration.

#### Question 4

This question involved studying the mechanism for a TV quiz show and thinking through various aspects of an actual game situation. As usual for this type of question, candidates needed to be careful to take account of all the rules of the game when finding the answers to the questions.

- (a) This part asked for the maximum possible prize, which involved considering how each stage worked. This was useful preparation for tackling later parts, and many candidates seem to have been too hasty at this stage.
- (b)(i) Most candidates correctly determined the amount in the two competitors' pots.
  - (ii) Better responses offered a succinct reason why the competitor did not attempt to answer the last quiz question, rather than a discourse on all the possible outcomes without a summary identifying the important issue: it was the only way she was sure to win.
- (c)(i) This part called for determination of the total number of successful responses by one of the competitors. Only those who showed working were able to gain partial credit if they did not get all of the components correct.
  - (ii) This part asked for the amount that a competitor won. Those candidates who did not consider all of what was needed in part (a) typically omitted items from consideration here as well.
  - (iii) Calculation of the largest possible difference required accounting both for the additional amount that a correct quiz answer would give and for the penalty that would not then have applied.
- (d) Candidates needed to observe the restriction that each competitor had only one round for each of the two special cases, and then to use a succession of observations about the numbers in the table to gather all the required information. Those who offered choices might usefully have observed that the question is expecting a specific answer.

# THINKING SKILLS

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<p><b>Paper 9694/33</b> <b>Problem Analysis and Solution</b></p>
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## Key messages

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## General comments

Since many candidates make arithmetic errors, not just with hours and minutes, for all parts of questions where there is more than one mark they should show their working to be able to gain partial credit, even where not explicitly required to do so for full marks. The numbers of marks for part questions are given, and candidates should be aware that multiple steps and considerably more time and effort can be expected for a three- or four-mark answer than for a single mark. Inappropriate dimensions, such as people per square second, are often a sign of error that candidates could notice and review what they have done.

Some able candidates appear to have spent too long on parts which they found hard, rather than leaving space and coming back for a fresh attempt after doing later questions.

## Comments on specific questions

### Question 1

This question explored a range of times and fares for a taxi driver on a simple route. In exploring maxima and minima it was essential to distinguish what was under the driver's control and what was not. Good responses avoided the use of 'min' for both minute and minimum.

- (a) Many candidates calculated a total, but only a few took care about the latest time he could depart from his home base and get back before the end of the shift, which is determined by taking the worst case for the traffic.
- (b) This involved finding a minimum (i.e. greatest certain) amount, again taking into account the latest time he could leave on his last journey. Better responses distinguished this question from one that might have been asked about the greatest possible income.
- (c) The maximum possible fare was wanted in this part. As the charging was for each 3 minutes or part thereof, the mark here required rounding up to a multiple of 3 minutes.
- (d)(i) This part introduced a requirement for a longer break. Better responses observed that there was only one break – long or short, but not both – in between journeys and did not add an unnecessary break at the end of the day.
- (ii) This part looked at the extreme cases and the differences in income between them. Better responses included or excluded all relevant factors to determine the extreme cases.

## Question 2

This question involved packing identical boxes in a room. It was necessary to show that it could be done with boxes of the given dimensions, and not just that the total volume of the room was sufficient.

- (a) The number of boxes that would fit in a given orientation was asked for. Better responses noted that whole numbers were inherent in this question and that rounding is inappropriate in this context.
- (b) This asked for the maximum number of boxes all in the same orientation. To be sure of full marks, all orientations should have been checked systematically.
- (c) A number of boxes, less than the maximum possible, but more than can be done using only one orientation, was asked for. Better responses sought to find an efficient way to handle the side whose length was not a multiple of any of the dimensions.
- (d) This part asked for a way to pack a given number of larger boxes, if possible. It is possible, using three different orientations. Few candidates went beyond what could be done with two orientations, although one candidate provided a much clearer and simpler layout than was expected.

## Question 3

This question involved a model of a queue of people wanting to buy tickets by telephone. The person using it has one curious but clear simplification: she always starts a call on an exact minute. Ignoring this feature led some candidates to expend considerable time and effort to get to wrong answers.

Some candidates introduced complexity and often errors by looking at when a person would be the first one waiting rather than the person being served.

- (a) Better responses calculated and gave a time of day in response to the question 'when' rather than something relative to an unspecified point in time.
- (b) The same process as used in part (a) was repeated until after a specified time. Candidates need to remember that there are only 60 minutes in an hour.
- (c) This part asked to show a result. Any candidates who did not get to the given answer had the opportunity to check what they had missed before tackling the more complicated later parts. As the end result was given, the marks were for the working, not copying out final figure. Many who could not do this part skipped the rest of this question and went on to **Question 4**.
- (d)(i) This asked for the time to start to queue and the precise time of being served. Many candidates omitted to write down the precise end time, and some missed the point by rounding it.
- (ii) This asked for the latest start time, which was not simply five minutes after the previous answer, although that would be a sound starting point for trial and improvement. Once again, the arrival time was asked for, but seldom included.
- (e)(i) This part asked for the rate. This is a case where a check of the dimensions would have helped to detect wrong answers. It is also usually simplest to use the units as they appear in the question, e.g. minutes or cm. If candidates are trained or prefer to use another system, such as SI units, they should take care both with the conversion and with handling rounding.
- (ii) This part looked at whether she would be able to buy a discounted ticket before the supply ran out. Only a few candidates took account of the different queue lengths for each iteration.



#### Question 4

This question involved studying the mechanism for a TV quiz show and thinking through various aspects of an actual game situation. As usual for this type of question, candidates needed to be careful to take account of all the rules of the game when finding the answers to the questions.

- (a) This part asked for the maximum possible prize, which involved considering how each stage worked. This was useful preparation for tackling later parts, and many candidates seem to have been too hasty at this stage.
- (b)(i) Most candidates correctly determined the amount in the two competitors' pots.
  - (ii) Better responses offered a succinct reason why the competitor did not attempt to answer the last quiz question, rather than a discourse on all the possible outcomes without a summary identifying the important issue: it was the only way she was sure to win.
- (c)(i) This part called for determination of the total number of successful responses by one of the competitors. Only those who showed working were able to gain partial credit if they did not get all of the components correct.
  - (ii) This part asked for the amount that a competitor won. Those candidates who did not consider all of what was needed in part (a) typically omitted items from consideration here as well.
  - (iii) Calculation of the largest possible difference required accounting both for the additional amount that a correct quiz answer would give and for the penalty that would not then have applied.
- (d) Candidates needed to observe the restriction that each competitor had only one round for each of the two special cases, and then to use a succession of observations about the numbers in the table to gather all the required information. Those who offered choices might usefully have observed that the question is expecting a specific answer.

# THINKING SKILLS

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<p>Paper 9694/41 Applied Reasoning</p>
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## Key messages

- In **Question 1**, many candidates gain few marks because they are criticising the *source* of the data rather than the presentation or use of the data.
- In **Question 3**, some candidates are still gaining zero marks because they are attempting the wrong task. They are asked to evaluate the reasoning, not to argue against it or to write their own opinions on the topic. Study of previous mark schemes should reveal the kinds of answers that are expected.
- In **Question 4**, candidates can only achieve the highest marks if they engage *critically* with the documents provided.

## General comments

Most candidates appeared to have enough time to finish the paper but a few did not. Often, those who did not have time to complete **Question 4** had spent a disproportionately long time on previous questions, although such responses were in the minority.

The standard of candidates varied but there was evidence that many candidates had not been well prepared. Many did not know what they were being asked to do, particularly in **Questions 2** and **3**.

## Comments on specific questions

### **Question 1**

Candidates were asked to criticise the statistics and claims presented in the advertisement. Many candidates devoted a large proportion of their answer to questioning the credibility or provenance of the data presented. Others hinted at points on the mark scheme but did not explain them sufficiently. For example, many noted that the data came from only one town or that the comparison was with only three stores, but they did not then suggest that perhaps this town or those stores had been selected by the advertisers because they reflected favourably on Lo-Kost. Few candidates gained more than two marks and many did not score at all. Many did explain some points sufficiently well and examples of most of the marking points were seen. No candidates noticed the assumption of a continuing trend nor did any explain, with sufficient clarity, the meaninglessness of comparing percentages from different, unknown baselines. Some candidates criticised the effectiveness of the advertisement for no credit.

### **Question 2**

This question, as usual, rewarded the well-prepared candidate. Those who knew what was expected and attempted an analysis of the argument usually gained three or four marks easily. The main conclusion was less obvious than on some previous occasions and was often presented as an IC/MC combination. Many candidates provided a non-creditworthy summary or gist. As ever, some candidates are still unaware that quoting from the text is an appropriate, indeed a required, way to answer this question. Some quoted from the text without labelling their quotes with the name of an argument element and could not be awarded any marks. A small minority attempted to evaluate the reasoning, which they were invited to do in **Question 3**.

### Question 3

The better-prepared candidates attempted to evaluate the passage, but many are still listing a series of counter-arguments to points in the passage. Those candidates who did attempt to apply their evaluation skills were able to gain some marks but rarely more than three. The most frequently credited weaknesses were the appeal to emotion and straw man in paragraph 2, and various references to the generalisability of Dolly the sheep's cloning success rate in paragraph 3. Some of the assumptions were spotted but these were usually awarded only one of the two available marks, because they were not expressed in terms of assumptions. Very few candidates are able to identify and name assumptions as assumptions, indeed many appear not to have learned that an assumption must not be stated in the text.

### Question 4

Candidates were required to use the documents and their own ideas to construct a reasoned case to support or challenge the conclusion that we should encourage scientists to pursue de-extinction projects. Most seemed able to engage with this topic. Many candidates were able to be able to arrange their ideas into strands of reasoning, are there was very little sequential treatment of documents. However, most candidates are still using the documents without a critical eye, which limits their marks for use of documents but also, necessarily, detracts from the persuasiveness of their case. Document 4 contained multiple viewpoints, which gave an opportunity to candidates to use it to enhance the effectiveness of their argument, but many treated this document as a holistic single viewpoint. It is worth reminding centres that what is likely to get high marks is a persuasive argument with a clear structure that is supported by thoughtful, particularly critical, use of the documents and that thoughtfully considers relevant alternative viewpoints.

# THINKING SKILLS

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Paper 9694/42  
Applied Reasoning

## Key messages

- In **Question 1**, many candidates gain few marks because they are criticising the *source* of the data rather than the presentation or use of the data.
- In **Question 3**, some candidates are still gaining zero marks because they are attempting the wrong task. They are asked to evaluate the reasoning, not to argue against it or to write their own opinions on the topic. Study of previous mark schemes should reveal the kinds of answers that are expected.
- In **Question 4**, candidates can only achieve the highest marks if they engage *critically* with the documents provided.

## General comments

Most candidates appeared to have enough time to finish the paper but a few did not. Often, those who did not have time to complete **Question 4** had spent a disproportionately long time on previous questions, although such responses were in the minority.

The standard of candidates varied but there was evidence that many candidates had not been well prepared. Many did not know what they were being asked to do, particularly in **Questions 2** and **3**.

## Comments on specific questions

### **Question 1**

Candidates were asked to criticise the claims presented in the advertisement. Many candidates devoted a large proportion of their answer to questioning the credibility or provenance of the data presented and, hence, few candidates gained more than two marks and many did not score at all. Many candidates did notice that the difference between the areas of the arrows was exaggerated and that  $2\frac{1}{2}$  times is not the same as 150 per cent. A smaller, but still sizeable, number did notice the conflation between 'more likely to lose weight' and 'lose more weight' and some candidates successfully questioned the ambiguity of 'by diet alone'. Some candidates noticed that 'by diet alone' was presented as a footnote but very few of these were able to connect this to an attempt to mislead the reader. Some candidates criticised the effectiveness of the advertisement for no credit.

### **Question 2**

This question rewarded the well-prepared candidate. Those who knew what was expected and attempted an analysis of the argument usually gained four marks easily. The main conclusion was less obvious than on some previous occasions so there were a number of responses which, having been unable to identify the main conclusion, were capped at four marks. Many candidates provided a non-creditworthy summary or gist. As ever, some candidates are still unaware that quoting from the text is an appropriate, indeed a required, way to answer this question. Some quoted from the text without labelling their quotes with the name of an argument element and could not be awarded any marks. A small minority attempted to evaluate the reasoning, which they were invited to do in **Question 3**.

### Question 3

The better prepared candidates attempted to evaluate the passage, but many are still listing a series of counter-arguments to points in the passage. Those candidates who did attempt to apply their evaluation skills were often able to gain some marks fairly easily. The most frequently credited weakness identified was the contradiction between respect and humiliation in paragraph 4. Most of the other weaknesses listed in the mark scheme were seen. Historically, very few candidates are able to identify assumptions, indeed many appear not to have learned that an assumption must not be stated in the text. However, on this occasion, the assumption in paragraph 3 was credited with some regularity and the assumption towards the end of paragraph 5 was occasionally expressed in a creditworthy manner.

### Question 4

Candidates were required to use the documents and their own ideas to construct a reasoned case to support or challenge the conclusion that TV companies should reduce their output of reality TV programmes. Many found they could engage with this topic and responses often contained examples of the candidates' own thinking and ideas. It was good that many candidates were able to arrange their ideas into strands of reasoning, as there was very little sequential treatment of documents. Indeed, in one large centre, candidates had clearly been taught to signpost the direction of their reasoning explicitly and to illustrate each strand of reasoning with an imaginative analogy of their own. Hence, marks for the structure and quality skills were a little higher than usual. However, most candidates are still using the documents without a critical eye, which limits their marks for use of documents but also, necessarily, detracts from the persuasiveness of their case. Document 3 contained multiple viewpoints, which gave an opportunity to candidates to look for corroborative or conflicting statements within as well as between documents. However, many candidates treated this document as a holistic single viewpoint, missing out on an opportunity to enhance the effectiveness of their argument. It is worth reminding centres that what is likely to get high marks is a persuasive argument with a clear structure that is supported by thoughtful, particularly critical, use of the documents and that thoughtfully considers relevant alternative viewpoints.

# THINKING SKILLS

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Paper 9694/43  
Applied Reasoning

## Key messages

- In **Question 1**, many candidates gain few marks because they are criticising the *source* of the data rather than the presentation or use of the data.
- In **Question 3**, some candidates are still gaining zero marks because they are attempting the wrong task. They are asked to evaluate the reasoning, not to argue against it or to write their own opinions on the topic. Study of previous mark schemes should reveal the kinds of answers that are expected.
- In **Question 4**, candidates can only achieve the highest marks if they engage *critically* with the documents provided.

## General comments

Most candidates appeared to have enough time to finish the paper but a few did not. Often, those who did not have time to complete **Question 4** had spent a disproportionately long time on previous questions, although such responses were in the minority.

The standard of candidates varied but there was evidence that many candidates had not been well prepared. Many did not know what they were being asked to do, particularly in **Questions 2** and **3**.

## Comments on specific questions

### **Question 1**

Candidates were asked to criticise the claims presented in the advertisement. Many candidates devoted a large proportion of their answer to questioning the credibility or provenance of the data presented and, hence, few candidates gained more than two marks and many did not score at all. Many candidates did notice that the difference between the areas of the arrows was exaggerated and that  $2\frac{1}{2}$  times is not the same as 150 per cent. A smaller, but still sizeable, number did notice the conflation between 'more likely to lose weight' and 'lose more weight' and some candidates successfully questioned the ambiguity of 'by diet alone'. Some candidates noticed that 'by diet alone' was presented as a footnote but very few of these were able to connect this to an attempt to mislead the reader. Some candidates criticised the effectiveness of the advertisement for no credit.

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