

# THINKING SKILLS

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Paper 9694/21  
Critical Thinking

## Key Messages

- In answers to **1(d)**, **2(d)** and **3(d)**, candidates should ensure that their reasoning/use of evidence supports the conclusion they are drawing from it.
- Many candidates are still gaining 0 marks for **Question 3(c)** 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 credited.

## General Comments

Most candidates had time to attempt the whole exam, but a few did not. Most of those who did not complete the exam omitted **Question 3(d)**, which was unfortunate, since that part-question is probably the source of the 3 easiest marks in the exam (for 2 or more reasons supporting a conclusion). It would be a good strategy for candidates who are running short of time to attempt **Question 3(d)** before **Question 3(c)**.

## Comments on Specific Questions

### Question 1

Most candidates understood that the accusation of armed robbery was probably a subterfuge to bring John Obanji within reach of the Marinian authorities. A few candidates confused the names of the three countries, which prevented them from giving clear explanations, and several misinterpreted the word “asylum” to mean that JO was mentally ill and had been admitted to a psychiatric hospital.

- (a) Nearly all candidates scored either 3 or 0 for this question, depending on whether they did or did not understand that the exchange of messages gave the Marinian authorities a motive to accuse JO falsely for a crime which probably never happened.
- (b) A good number of candidates followed the line of the first answer in the mark scheme (vested interest to lie, in order to have JO sent back to Marinia). Many candidates merely stated that HH had a “bias” against JO, but this did not go far enough and was therefore not credited. Vested interest should be expressed with a verb, such as ‘to lie’. The most popular answer was that HH did not have ability to see, which was not credited, since it was contradicted in the source; if candidates thought he might have been lying about his ability to see, they needed to explain why, which would have been credited. Also not credited were speculative answers, such as that HH may have left his spectacles at home, or may have had a pre-existing acrimonious relationship with JO.
- (c) Most candidates correctly identified one or two correct answers to this question, and many of them explained their answers fully enough to achieve 4 marks out of 4. A few candidates misunderstood the nature of the task, and tried to show how Sources D and E supported the claim that Marinia and Kaldovia were allies.
- (d) A wide range of marks was awarded for this question. By far the most popular answer was that JO was falsely accused, in order to bring him within the reach of the Marinian authorities. There were some good answers, including persuasive inferential reasoning. A few candidates lost marks because they omitted to state their conclusion explicitly, although the reasoning made it clear what they had in mind.

## Question 2

Four documents were presented, each offering different claims concerning the best time of day to exercise.

- (a) The point of this question was the representativeness of the sample. By far the majority of candidates achieved at least 2 marks out of 3. Some of them drew attention to the stated identifying characteristics of the sample, without suggesting any reason why they might make the sample unrepresentative, but there were several correct answers available for full marks, and a good proportion of candidates achieved them. Several candidates incorrectly stated that all the swimmers were aged 18, instead of having an average age of 18.
- (b) Most candidates correctly identified and explained at least one of the answers from the mark scheme, and many offered two. The most popular answers were that there is not much difference between “late afternoon” and “evening” (although it is not true that they are the same, as some candidates claimed) and that the two documents were looking at the issue from different angles. Quite a lot of candidates gave a weak version of the first of these, by saying that the two documents agreed on advising against exercising in the morning. Some candidates lost marks by apparently thinking that mentioning both sides of a contrast or similarity between the two sources constituted two answers rather than one.
- (c) Many candidates offered one or both of the first two answers on the mark scheme, each of which seriously compromised the validity of the research. A good number of candidates actually used the technical vocabulary of “confounding variable”.
- (d) There were some very good answers, which drew on both persuasive evaluation of the sources and also personal reasoning to draw a nuanced conclusion. However, quite a lot of candidates summarised the sources and stated a conclusion, without being able to make rigorous links between them. Others gave their own reasoning, without reference to the sources, which capped their mark at 2 even though some of those discussions were good.

## Question 3

Very few candidates sympathized with the argument presented in **Question 3**, and this lack of sympathy prevented some of them from evaluating it carefully.

- (a) A good proportion of candidates correctly identified the main conclusion of the argument, although there were also quite a lot of wrong answers. The most popular wrong answer was the final sentence of paragraph 1 – perhaps because candidates had seen several previous papers in which the conclusion was located in that position.
- (b) Some candidates scored 3 or 0 on this question, but most correctly identified 1 or 2 correct answers. Almost everyone who offered the answer “No change can have such strong support” added the supporting reason “because it cannot have stood the test of time,” although the conjunction “because” should have been a clear indicator that the clause it introduces is a separate analytical item. A few candidates presented their answers in continuous prose, but bullet-points are more appropriate for this question.
- (c) A fair number of candidates succeeded in identifying flaws, weaknesses and assumptions in the passage. A very few realized that the expression “unstated assumption” does not mean an unsupported statement. As in previous series, however, many scored 0 marks, by arguing against the views stated in the passage or expressing their own opinions on the topic, instead of evaluating its reasoning. The arguments presented to candidates in **Question 3** are always deliberately written with significant flaws, weaknesses and assumptions, and the point of **Question 3(c)** is always for candidates to identify a few of them.

Comments which were not credited included:

- The author is stating his own opinions (not only is this what arguments are supposed to do, but the comment is also circular, since the only access candidates have to the implied author’s opinions is *via* the argument).
- The argument is one-sided.

- The author is biased.
- The author should have given statistical evidence.

As quite often happens, this passage included a counter-assertion, with response. This is a normal feature of arguments, and is generally considered to be a strength, provided that the counter is not a straw man and that the response is convincing. In this case, the counter-assertion caused some candidates to criticise the author for contradicting himself, while others criticised the argument for not including any counter, even though it did.

- (d) As always, candidates were asked to support **or** challenge a claim, but a significant minority chose to discuss both sides, without coming to a conclusion, which limited their mark to 1. A few candidates scored 0 because the reasons they gave did not support their stated conclusion; some of them restated the conclusion rather than supporting it. Some reasons – such as space travel – would have supported a more general conclusion about the value of technology, but did not relate to improving the quality of life. A few candidates discussed the passage, instead of the claim they had been asked to support or challenge. A large majority of candidates scored 3, for supporting the conclusion by several separate ideas or examples, but some achieved 4 or 5 by presenting a coherent (but not necessarily lengthy) argument.

# THINKING SKILLS

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Paper 9694/22  
Critical Thinking

## Key messages

- Little credit can be given for answer content which merely repeats what is in the passage. Many candidates waste time by doing this and typically gain any marks for one or two sentences at the end of their answer. This is often the reason why the answers to 3-mark questions are over-long.
- In several questions, candidates need to think beyond the more obvious points that can be made if they are to gain a mark of pass standard. This is particularly the case in 3-mark questions where many candidates only succeed in gaining 1 mark.

## General Comments

Candidates seemed to respond well to the issues raised by the questions and were able to tackle them effectively. As in previous papers, some candidates need to understand that expressing opinions about the issues raised or showing further knowledge of them is not the focus of the paper and cannot receive much credit, if any. A significant minority of candidates spend too much time on **Question 1** meaning subsequent questions are rushed. In particular, they did not get on to **Question 3d** where the marks are more accessible than in other questions. Such candidates also have over-long answers on the 3-mark questions in **Questions 1** and **2**.

## Comments on specific questions

### **Question 1**

Parts (a), (b) and (c) were not answered very well.

- (a) Whilst many candidates saw the relevance of the poor economic situation to a possible motive for the owner to give dubious advice to the walkers, few moved beyond this. Some candidates did also note that we did not know the size of the Hotel Splendide but many assumed it was a small hotel. Given it was worth 4 marks, most candidates got off to a rather poor start on this question.
- (b) Only a minority of candidates saw that the paper was surprisingly un-biased towards local businesses. Rather more saw that reliability was increased through local knowledge.
- (c) This question produced somewhat better answers though only a minority fully explored the significance: at first sight, the sentence justifies the hotel owner's assertion that they were experienced walkers; but this initial impression is tempered by the implication that they would not understand the avalanche risk. A number of candidates did make the point that Source D suggests experience is pretty irrelevant anyway when it comes to avoiding avalanches.
- (d) This part of the question was done well and many candidates managed to compensate for their poorer performance on the previous question. Most did explore a plausible alternative conclusion and saw that it was difficult to apportion blame entirely on any one of the participants.

## Question 2

- (a) This question was not done very well with few candidates moving beyond the obvious point that the implication is that the high use of solar energy in Germany means that cloudiness is not an obstacle. Only a minority of candidates saw that this high use does not mean that the solar power is necessarily very effective.
- (b) The stronger answers noted that this criticism also applied to any form of energy production. A significant number of candidates also pointed out that the criticism did not apply to small-scale/rooftop solar energy.
- (c) This question was done well, with many candidates gaining 3 marks and often using information in the sources effectively (not that this was a requirement of the question). A minority of the candidates seemed to misunderstand the term 'undermine' and explored reasons why sunny countries *would* adopt solar power.
- (d) Whilst a minority of answers did just repeat what was in the sources, a good number did use and evaluate the information in them. They also came up with a subtle conclusion, along the lines of 'important but not necessarily the most important'. The best answers saw that the decline in the cost of solar power might not continue and that we would need to know more about other sources of renewable energy in order to reach this conclusion.

## Question 3

- (a) A significant number of candidates identified the main conclusion without adding the reason. Most candidates gained at least one mark on this question.
- (b) In this question also, most candidates gained 1 or 2 marks and a significant number gained 3. The answers to parts (a) and (b) suggested most candidates had a good grasp of the structure of the argument.
- (c) Candidates who understood the nature of the exercise did reasonably well and there was a significant increase in the number who did correctly evaluate the reasoning rather than challenging propositions or commenting on the style of the argument. There were somewhat fewer 4 or 5 mark answers than last year but many candidates gained 3 marks. Some candidates seem to have knowledge of the correct expressions for flaws such as *ad hominem* and *post hoc* but did not really know how to actually identify these flaws.
- (d) Candidates used the proposition very effectively and there were many 4 or 5 marks answers. Most argued against using the Internet for this purpose though there were also some good arguments in favour. Some candidates raised a counter position and then failed to reply to it, which meant that they really moved on to a different argument. Candidates should not raise a position that opposes their line of reasoning if they do not have an effective reply to it: it can only be credited as a counter-argument if they have done this.

# THINKING SKILLS

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Paper 9694/23  
Critical Thinking

## Key messages

- Little credit can be given for answer content which merely repeats what is in the passage. Many candidates waste time by doing this and typically gain any marks for one or two sentences at the end of their answer. This is often the reason why the answers to 3-mark questions are over-long.
- Particularly, but not exclusively, in **Question 1**, candidates need to realise the provisional nature of points being made in the light of the assumptions and inferences that are applied. For example, in **Question 1(a)**, the fact that the mother and Mrs Smith are talking is *consistent* with their being friends but one cannot definitely infer that they are. This means that we cannot *categorically* say whether or not they are friends. Candidates have a tendency to make categorical statements about the participants or the issues where there are not sufficient grounds to do so.

## General Comments

Most candidates seemed to respond well to the issues raised by the other questions and were able to tackle them effectively. As in previous series, some candidates need to understand that expressing opinions about the issues raised or showing further knowledge of them is not the focus of the paper and cannot receive much credit, if any. However, there seemed fewer such candidates for this paper. It is still the case that some candidates who do well on the first three parts of **Questions 1** and **2** often spend too little time on part **(d)**, where a fuller answer is required. However, again there seemed to be fewer such candidates.

## Comments on specific questions

### Question 1

- (a) Whilst a significant minority of candidates were able to make the simple point about bias *and* the unjustified nature of the inference Jones is making about Mrs Smith and the mother's friendship, many answers were confined to the first point. A number of candidates discussed the whole of the evidence in Source B instead of focussing on the significance of the mother and Mrs Smith talking.
- (b) The point about the provisional nature of evidence noted above is relevant to problems here. Many candidates assumed Mrs Smith was neutral because she did not admit to talking to the mother and referred to her in an impersonal way ("I saw a mother"). However, if she was trying to provide a false alibi for a friend she would pretend not to know the mother. A number of candidates managed to make the point that a good relationship is not the same as good behaviour.
- (c) An alarming number of candidates felt able to totally blacken Jones's character because of the letter from the principal. The mark scheme credits the opposite of this, i.e. that one cannot make general inferences about Jones's character from a specific academic context. Many candidates were able to make the point that Jones could be distracted by the letter/too many late nights and that this was relevant. Again a significant number of candidates spotted the problems his promise as a scientist created for the mother's assertion that Jones was clumsy. Some candidates made points about the *reliability* of the evidence which was not the focus of this question.

- (d) The nature of the question meant that candidates were naturally led into considering two scenarios which boosted marks. Most thought that Andy Jones was guilty, though sometimes the reasoning leading to this conclusion was a bit suspect (based on Sources C and E we can conclude he was a clumsy liar). Some had Jones deliberately smashing the vase in a fit of rage because of the letter from the principal. Some candidates concluded that the vase was smashed by either the child or Jones which, whilst probably true, did not really progress the issue very much.

### Question 2

- (a) Large numbers of candidates thought this was an argument. It is actually a series of statements from which a conclusion *could* be drawn, but such a conclusion is not drawn. It is therefore not an argument.
- (b) Many candidates also found this question difficult. Candidates needed to see that it did *not* give sufficient grounds for the installation of street lighting if there were better ways of increasing community pride. Given the problems with street lighting indicated in the sources, it is likely that there is a better way of achieving community pride.
- (c) This was answered well and compensated for the rather poor performance on parts (a) and (b), especially as it was a 4-mark question.
- (d) This was also answered reasonably well, with many Level 2 and 3 answers. This further compensated for poor performance on parts (a) and (b). Only a minority of candidates made the key point that modern forms of crime, such as cybercrime, are clearly unaffected by street lighting meaning that, if this crime was becoming more prevalent, it might not be making a *major* contribution to crime control.

### Question 3

- (a) Many candidates were not able to identify the conclusion, though a number got one mark for "It is a most unwelcome invention".
- (b) Most candidates identified "Satnav frequently makes mistakes" but only a minority managed to move beyond this.
- (c) The nature of the topic meant that candidates were tempted to challenge the statements in the passage rather than evaluating the reasoning. In particular, they were inclined to point out that an aspect of satnav is reading a map on a screen. However, many candidates managed to see that there is a dubious assumption that using maps is not distracting and that not needing map-reading skills whilst driving does not mean that maps have become redundant in all other contexts. This meant there were a reasonable number of 2 or 3 mark answers though somewhat fewer 4 or 5 mark answers.
- (d) Candidates engaged well with the conclusion on offer and, not surprisingly, most argued that young people should be encouraged to travel. Most candidates also provided good reasons why specifically *young* people should travel. The nature of the topic seemed to lend itself to producing intermediate conclusions and counter-arguments. However, as regards the latter, candidates must reply to any point raised against their line of reasoning otherwise it is not a counter-argument as such. Without a reply, it becomes a different argument which detracts from the overall coherence of their original line of reasoning. If candidates do not have an effective reply to any objections they raise to their line of reasoning, they would be better off not including these objections.



# THINKING SKILLS

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Paper 9694/31  
Problem Analysis and Solution

## Key Messages

Candidates should aim to offer as precise an explanation as possible when explaining their solutions, in a Problem Solving paper. This may involve the consideration of precise numerical cases, which often need to be judiciously selected. If a precise distinction/justification is possible, then candidates should aim to state it.

## General Comments

All four questions on this paper proved to be accessible to most candidates – as measured by candidates' ability to gain at least some marks on each one. Each of them had elements which appeared to strain candidates' problem-solving skills in different ways. The first question placed a burden on candidates to verbally explain their logic; the second required them to calculate probabilities; the third depended on a consistent approach to rounding; and the fourth involved a pragmatic approach to permutations.

Candidates' standard of working was notably better than previous series, particularly on **Question 3** – although many candidates are still only presenting a minimal standard of working, and suffer as a result. If there is more than one mark available for a question, candidates should always endeavour to show some working. Candidates are advised to not cross out working unless they have replaced it something better.

## Comments on Specific Questions

### Question 1

This question required candidates to consider what permutations are possible on an interlocking two-dimensional surface, subject to a simple rule. Certain sections of the pattern are defined by the existing bricks, and other sections permit a number of possible alternatives – four of the marks were dependent on explaining how the existing pattern restricted the alternatives, and required careful articulation of what was permissible and why.

- (a) Candidates were expected to consider what alternatives were possible, and offer an exhaustive account of why the brick in question had to be coloured 1 in this question. The most common inadequate answer here was to appeal to the pair of 2s, without commenting on why the colour 3 could not be used. Some reference to the exclusion of a third colour was deemed necessary for a complete, mark-winning solution.
- (b) Most candidates managed to complete this question correctly, and there was a telling number who managed this, even though they could not articulate the necessary reasoning in **Question 1(a)**.
- (c) The majority of candidates appreciated the single step of reasoning which prevented Ckl being coloured 2 or 3, and the challenge for candidates lay in choosing between 1 and 4, and explaining why. Most of the satisfactory explanations appealed to the limitations that grew from the existing bricks in the top right hand corner of the wall – any reference to the fact that Ckl and Blm had to be paired together, to enable that corner to be completed, was awarded the mark.
- (d) This question required an explanation why two bricks had to be paired, rather than an explanation of which colours were feasible. This required precision of expression (not necessarily using the three-letter codes, but it had to be some unambiguous means of referring to the bricks), and a logical exploration of what happened if they were not paired. Most candidates did not manage to do this. Those who did tended to be win both marks, by referring to the key restriction that the surrounding bricks imposed (Bde and Bfg could not be paired) and offering an explanation of why not (the pair being surrounded by bricks of all four colours).



- (e) This question was answered fairly well, depending as it did on a careful evolution of the logic imposed by the existing bricks, rather than precision of expression. Follow-through marks were available for those who concluded the colour of Ckl incorrectly in part (c). Solutions which only offered 5 numbers were assumed to have omitted the existing bricks, and marked as such.
- (f) This question was rarely answered completely – an additional layer of difficulty being imposed by the need to exhaust all the options, with no limit being offered in the text. A systematic approach was needed to include all of these. Most candidates offered only four of the eight options.

## Question 2

This question required candidates to wield and explore a more involved logical mechanism than that of **Question 1**; the question also required candidates to consider the patterns of behaviour of travellers as a proportion or probability, which many candidates found challenging. The mathematical tools for quantifying the likelihood of certain outcomes from a collection of equally likely alternatives is expected in the Problem Solving paper, and is clearly something that students have trouble mastering.

- (a) This processing task was completed successfully by most candidates. A small minority of candidates did not appreciate that it was asking for the **change** in cost.
- (b) This question was not answered correctly by many candidates. The terminology of probability appeared to confuse some candidates, who were tempted to offer qualitative answers (for instance, 'highly unlikely'). Of those who offered a numerical answer, many suggested  $\frac{1}{2}$ , or  $\frac{36}{37}$ . The former answer revealed a misconception about what alternatives were to be treated as 'equally likely' in the proportional reasoning. The latter probably represented an intelligent guess. A small number of candidates may have missed out on marks just because of clumsy rounding here: as a rule, candidates should write down the precise solution to any calculation (a fraction being the recommended format), before rounding to three significant figures if necessary.
- (c) This question was tackled substantially better than part (b). Solutions did not have to be represented as an inequality, and inappropriate limits were condoned, so long as the limits were the same at both 'ends'. The most common misconception was to consider one of the limits to be \$18.
- (d) This question required candidates to structure the alternatives clearly, and very few candidates managed to gain both marks. An algebraic approach was not necessary, although it may have been the least taxing, since it did allow for the pieces of the 'puzzle' to be expressed individually. A number of candidates appreciated that the comparative changes of \$11 and \$12 were at the heart of the problem, but were not able to deduce the correct answer from this.
- (e) This processing task was completed fairly well by most candidates. The most common error was to consider the 76 Singles sold in pairs as 76 Singles – which attracted one mark.
- (f) (i) (ii) These questions were answered fairly well by most candidates. Very little working was shown, and it was not easy to diagnose the misconceptions occurring behind erroneous answers. Follow-through marks were available for those who treated the 76 pairs as 76 Singles in (ii).

## Question 3

This question invited candidates to consider an evolving economic situation, as a businesswoman estimated the profits to be made by employing extra staff. The proportions of time required to sculpt the products, maintain the operation, and oversee other staff were best dealt with in fractions, and a number of candidates undermined their work processing the different costs and times by rounding erratically and disproportionately. Many candidates would clearly have benefitted from further acclimatisation in the use of fractions, and a consistent approach to rounding – as mentioned above, the general rule should be that all answers are given precisely before rounding, AND that rounding should not be done amidst calculations (or at least it should not be one without considering the consequences).

- (a) The opening question was aimed at confirming the essential relations of time, money and number of commissions for candidates: and in particular to recommend the calculation of the number of commissions in order to calculate the profit. Both calculations (the product and the quotient) were

needed to gain the marks here, although there were a number of ways of presenting this – for instance by considering the sculpting work and unskilled work separately. Most candidates completed this successfully.

- (b) This question introduced candidates to the calculation of profits, given incomplete commissions. The most common error here seemed to stem from not appreciating that the example in the preceding paragraph was an **example** of an appropriate fraction, rather than a rule (the misconception being that all partial jobs should be considered as half done). Many candidates showed their working clearly for this question, and in the following questions, and were awarded for their care and clarity. The key element which enabled partial marks to be awarded was the calculation of the number of commissions being considered in each case: an unambiguous record of this (use of the word ‘commissions’ being the most advisable!) often salvaged solutions which had lost their way amidst the processing, or lost all definition due to inappropriate rounding.
- (c) This question was technically harder than (b), since it required some consideration of inverse operations. Working was much less well organised and hence gained fewer partial marks. A few candidates attempted to tackle this question by trial and improvement methods – but most appreciated that a precise answer could be reached more efficiently by considering the inverse operations required.
- (d) This question mirrored the requirements of (b), but required candidates to appreciate how the supervision of artisans affected the number of commissions possible in a given month. The key element of any solution which enabled the award of partial marks was the number of commissions – and most of those who attempted to calculate this were awarded at least one mark.
- (e) Although this question did not explicitly ask for supporting working, some visible working was necessary for the award of both marks here. This reflects the instruction on the front of the exam paper: ‘marks may be lost if working needed to support an answer is not shown’. As with (b) and (d), the calculation of the number of commissions was essential to the logic of this.
- (f) This open-ended optimisation question, which naturally drew together the threads considered in the questions so far, was tackled with much less success than the preceding parts. This was partly due to the appreciation of how many unskilled artisans it was possible to employ, which was essential to a correct answer: the fact that each artisan requires 12 minutes of supervision per hour placed a limit of 5 on Claudel’s business. Candidates who showed appropriate working for alternative numbers of artisans were awarded partial marks, but the four constituent parts of the calculation had to be unambiguous.

#### Question 4

The ‘complex data’ question required candidates to consider how ‘words’ could be constructed from a set of components, with the existence of wild cards and bonus cards complicating the issue. The potentially dizzying array of permutations invited candidates to classify the cards, although this was not strictly required (and may have left little trace on the candidates’ answer booklets). Many of the questions required a combination of straightforward searching with a consideration of basic permutations.

- (a) Most candidates found this introductory processing question accessible.
- (b) This question was not really an optimisation question, since the required prize money was stated, and candidates needed only to go through the list calculating the total value of any states which seemed viable (given the inclusion of the \$100 bonus). The vast majority of candidates managed this correctly.
- (c) This question required candidates to narrow the search space down to those states which included –O–A (there are only three), and then choose the maximum. Half the candidates managed this correctly: a substantial minority managed to identify the state but not the amount of prize money (which was awarded no marks).
- (d)(i) The search requirements were less clear here – it was certainly easier to identify which states could be made from Wild Cards (10 of the 16), and then to strike out components which appeared in the Prize Card list. This left only NEVADA. Most candidates managed this correctly.

- (ii) This questions involved a greater dependence on the logic of permutations than systematic search. Consideration of those states beginning with A or M yielded the correct answer – MONTANA. Most of those who attempted this question stated this correctly.
- (e) This question required the same approach as (b), and was completed equally well. Arithmetic errors were probably the source of most of the solutions not gaining three marks here.
- (f) (i) (ii) Both of these questions were best tackled by permuting the cards that Tex and Carol each had until a viable state was found. Full marks were awarded for any viable claim (whether optimal or not). The most common error here was to assume that Tex could use both Bonus Cards (yielding \$390), which was awarded no marks.
- (g) Most candidates arranged Tex and Carol's cards into a collection states with little evidence of a system. This led to a variety of plausible answers, some of which re-used cards, and most of which were not optimal – which were awarded one or two marks.
- (h) There was some evidence of a systematic approach to this question – but no working was needed to gain full marks in this case. Although there were 15 different beginnings to the states listed, that list included VERMONT, and hence the correct answer of 14. Those who attempted to consider the endings had to remove NEVADA (achievable only by using a Wild Card) and MONTANA.

# THINKING SKILLS

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Paper 9694/32

Problem Analysis and Solution

## Key Message

Candidates should aim to show key elements of their working for any question which offers more than 1 mark. This need not involve sentence answers, but should be intelligible to someone who has considered the problem – in particular, it should include key words which show what ‘stepping stone’ calculations have been completed.

## General Comments

All four of the questions on this paper proved to be accessible to most candidates – as indicated by candidates’ ability to gain at least some marks on each one. Overall, candidates seemed to benefit from the extension to the time limit – as evidenced by there being fewer candidates leaving **Question 4** unfinished. As mentioned above, there was still room for improvement in the way that candidates explained their working. Candidates are advised to not cross out working unless they have replaced it with something better.

## Comments on Specific Questions

### Question 1

This question required candidates to consider the permutations that were possible in a crowded three-stranded linear problem space, and to consider how the maximum and minimum number of attendees affect each other. There was one key restriction on the movement of workshops (“starting earlier is not possible...”), which applied throughout.

- (a) Most candidates were able to select the appropriate time and place for the Flower Arranging workshop. The avoidance of a time when ‘any form of Yoga’ and the Macrobiotic Food session were running involved identifying these cases on the table and choosing the earliest time available. Some candidates did not offer a venue (and hence scored 0 marks).
- (b) (i) and (ii). These questions were best tackled together: the presentation of the revised timetable had to be clear enough to assess where the 7 workshops planned for Unity had gone. About half the candidates managed to answer this completely. The most common error was to allow workshops to be scheduled earlier than their original time. A number of candidates offered correct answers to (ii), but not (i) – which mostly reflected a failure to appreciate that a later date is not the same as a later time.
- (c) Most candidates managed to appreciate that 1 pm and 3 pm were the preferable time slots, simply because more people wanted to go to 2 pm sessions than 3 pm sessions. This attracted 1 mark. In order to gain both marks, candidates had to show that Michel could arrange it so that everybody could attend (as stated just above the question); which required some reference to the total numbers attending other sessions. In particular, it required a clear statement that 42 would need to attend the other session if one was held at 2 pm (impossible) or that 32 could attend the 1 pm session if it was paired with 3 pm.
- (d) Answering this question correctly required careful tracking of who could attend which session, including Michel. This was accomplished by very few candidates. Few partial marks were gained here because candidates’ solutions did not tend to make it clear whether they were considering the number of attendees or the number of spaces. The inclusion of Michel in each session required care – it was most easily done by simply viewing the capacity of the tent as 39, not 40.

- (e) This question was accomplished by about half the candidates. The most common error was to require a three-move re-arrangement, or for one of the workshops to move earlier.

## Question 2

This question explored a mechanism for re-dividing cake equitably between three individuals. The basic idea seemed accessible to most candidates (that of redrawing the line between the largest and smallest slice to roughly equalise them) – but much of the problem-solving came from consideration of the inverse process, and an overlapping collection of ‘optimisation’ conditions. This involved some explorative processing, which needed to be tracked (and combined with dependable arithmetic) in order to achieve the stated aims.

- (a) This processing task required candidates to apply the described method to an uncontroversial case (without odd numbers), twice in succession. The most common errors appeared to involve applying the equalising process to the first two slices listed (rather than the smallest and biggest), and applying the process only once.
- (b) This question was dealt with more proficiently than (a), even though it required mastery of the ‘inverse’ operation. A correct answer to this question required a number which was less than or equal to 104, paired with another to sum to 256. The most common error was to choose a pair whose lesser number was greater than 104 (e.g. 110 and 146).
- (c) Further reverse processing was needed here, twice over, initiating from a cut with at least one portion not in the required range. The easiest way to accomplish this was to begin with a cut that was minimally outside the range (e.g. 114, 114, 132), and work backwards (as done in (b)). Few candidates left clear working about the order in which the cuts were occurring – and hence few were able to gain partial marks if their final solution was not viable.
- (d) Quite a few candidates managed to identify one or two of the triplets which were within 10 degrees of each other, and yet which left the sisters unhappy. A small number of candidates offered initial cuts which led to these, after having been dealt with by one of the other sisters, which also attracted full marks.
- (e) An alternative, and more orthodox, optimisation was required for this question. In principle it was less easy to find, since it was not clear what the optimal cut could be, given the initial restrictions. However, a greater number succeeded at this than (d) – some left a trace of a trial and improvement method, and others of a methodical approach to the initial values.

## Question 3

This question required candidates to investigate competing pricing systems for cleaning companies, based upon a combination of fixed charges, floor area and the number of rooms. The inequalities derived from these changing pricing schemes provided the problem-solving, combined with some optimisation questions, and the need for ‘reverse operations’.

- (a) This processing task was completed successfully by almost all candidates.
- (b) The reverse operation required by this question – dividing the answer to (a) by 50 – was tackled successfully by most candidates.
- (c) This question did not need to be phrased algebraically, although a number of candidates successfully did this. The combination of forward and reverse operations did unbalance some candidates, but most were able to deduce an area of 80 square metres.
- (d) This question introduced the profit, as well as variation in the number of cleaners, and an amount of reverse processing. A solution to the question did not depend on the number of rooms or the floor area, and therefore required candidates to work at a level of generality not seen in the first three parts. About half of the candidates tackled this correctly. The most common error was to compare Trevor’s profit for the Express service with \$1.50 per square metre (ignoring the cost of the one cleaner).
- (e) (i) The introductory text for this question naturally produced an inequality, which could be solved for the number of rooms. The inequality took some care to parse, however, and most successful

candidates appeared to infer the number of rooms by considering the change in price. Few candidates managed to offer a credit-worthy answer to this questions using either method.

- (ii) Some of the candidates who solved this question did so algebraically, and some by more informal 'reverse processing'. Full marks were awarded for a correct follow-through from their answer to (e)(i).
- (f) This question proved to be tough, with very few candidates managing to deliver a correct answer. One reason for this was that it was not obvious what the area of the smallest room was, and yet this was vital to any correct assault on the question. If the price reduced by \$15, and he charged \$1.50 per square metre, then the smallest room must have been 10 square metres: and if it was reduced by more than \$15, then the smallest room must have been at least 11 square metres. This enables inequalities to be set up and the conclusion reached.

#### Question 4

Success at this question depended on careful application of the scoring mechanism to the table of results. The scoring mechanism yields simple linear relations, allowing for details of the individual sores to be deduced.

- (a) This question involved comparing the contestants' choices table and the performance results, and identifying the geography scores: this was only completed successfully by about three-quarters of the candidates. Many selected 16, 16 and 17 as the relevant scores, and concluded that there had been 49 correct answers.
- (b)(i) 16 correct questions and 71 points yields the following relation:  $(5 \times 16) - (3 \times w) = 71$ , if there are fewer than 4 passes. From this it can be concluded that  $w = 3$ , i.e. there were 3 wrong answers. From this it can inferred that there was  $(20 - 16 - 3 =)$  1 pass. About 2/3 of the candidates managed this – a frustrating few did most of the work, but did not state how many passes were involved and scored 0 marks.
- (ii) Similar logic applied to Sophie's case yields  $(5 \times 15) - (3 \times w) = 71$  and  $w = 4/3$ , which is not possible. Where there are 4 passes or more, the equation becomes  $(5 \times 15) - (3 \times w) - (2 - w)(2) = 71$  and thus  $w = 0$ . From this it can be inferred that there were  $(20 - 15 - 0 =)$  5 passes. Half the candidates accomplished this successfully.
- (c) The identification of Wesley's Double Dare round required appreciation of how the altered scoring system generated scores, and in particular the fact that it would always produce multiples of 10. From this it can swiftly be concluded that Wesley Double-Dared Round 4, and this involved the category 'People'. A substantial number of candidates offered the Round, not the category and were awarded only 1 mark here – candidates should ritualise a checking mechanism, which verifies that the answer is both clear and appropriate.
- (d)(i) Most candidates were able to deduce how many correct answers Sophie gave in Round 4, and about 2/3 converted this into a minimum score of 52 (if she had not Double Dared).
- (ii) This question proved trickier than (d)(i) because of the condition applied to scoring the passes. The most common mistake here was to subtract 2 points for every pass (yielding 58).
- (e)(i) Although the relevant information was buried amidst a page of information, the question did merely require the comparison of two short lists, to identify which category had not already been chosen by Norma. 2/3 of the candidates managed this successfully.
- (ii) A successful answer to this question depended on appreciation that such a guarantee required Wesley scoring the maximum number of points in the last round. Norma needed 147 points to beat this – and 1 mark was awarded for candidates who appreciated this (or that 146 left their scores equal). To convert this into a minimum of correct answers was most easily done by trial and improvement. Few candidates left comprehensible working for this question, and so most scored 0 or 2.
- (iii) This was a similarly-structured question to (e)(ii), requiring Norma's score to be maximised (100) and then a minimal victorious score for Wesley to be calculated. Candidates found this easier; once again there was little comprehensible working to distinguish between the wrong answers.

- (iv) This question required candidates to select information pertinent to the question, and offer a judgment about whether Norma should Double Dare. There was no 'correct' judgement, nor were marks reserved for the lucidity of the justification: candidates were awarded marks for offering 2 separate pieces of new information which were deemed relevant to the situation. They could be speculative (such as comments about the risks of missing out on the Runner-up prize), or descriptive (such as general comments about Wesley's performance so far), or probabilistic. Many candidates offered one relevant comment, but few offered two.



# THINKING SKILLS

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Paper 9694/33  
Problem Analysis and Solution

## Key Messages

Candidates should aim to offer as precise an explanation as possible when explaining their solutions, in a Problem Solving paper. This may involve the consideration of precise numerical cases, which often need to be judiciously selected. If a precise distinction/justification is possible, then candidates should aim to state it.

## General Comments

All four questions on this paper proved to be accessible to most candidates – as measured by candidates' ability to gain at least some marks on each one. Each of them had elements which appeared to strain candidates' problem-solving skills in different ways. The first question placed a burden on candidates to verbally explain their logic; the second required them to calculate probabilities; the third depended on a consistent approach to rounding; and the fourth involved a pragmatic approach to permutations. Candidates' standard of working was notably better than previous series, particularly on **Question 3** – although many candidates are still only presenting a minimal standard of working, and suffer as a result. If there is more than one mark available for a question, candidates should always endeavour to show some working. Candidates are advised to not cross out working unless they have replaced it something better.

## Comments on Specific Questions

### Question 1

This question required candidates to consider what permutations are possible on an interlocking two-dimensional surface, subject to a simple rule. Certain sections of the pattern are defined by the existing bricks, and other sections permit a number of possible alternatives – four of the marks were dependent on explaining how the existing pattern restricted the alternatives, and required careful articulation of what was permissible and why.

- (a) Candidates were expected to consider what alternatives were possible, and offer an exhaustive account of why the brick in question had to be coloured 1 in this question. The most common inadequate answer here was to appeal to the pair of 2s, without commenting on why the colour 3 could not be used. Some reference to the exclusion of a third colour was deemed necessary for a complete, mark-winning solution.
- (b) Most candidates managed to complete this question correctly, and there was a telling number who managed this, even though they could not articulate the necessary reasoning in **Question 1(a)**.
- (c) The majority of candidates appreciated the single step of reasoning which prevented Ckl being coloured 2 or 3, and the challenge for candidates lay in choosing between 1 and 4, and explaining why. Most of the satisfactory explanations appealed to the limitations that grew from the existing bricks in the top right hand corner of the wall – any reference to the fact that Ckl and Blm had to be paired together, to enable that corner to be completed, was awarded the mark.
- (d) This question required an explanation why two bricks had to be paired, rather than an explanation of which colours were feasible. This required precision of expression (not necessarily using the three-letter codes, but it had to be some unambiguous means of referring to the bricks), and a logical exploration of what happened if they were not paired. Most candidates did not manage to do this. Those who did tended to be win both marks, by referring to the key restriction that the surrounding bricks imposed (Bde and Bfg could not be paired) and offering an explanation of why not (the pair being surrounded by bricks of all four colours).

- (e) This question was answered fairly well, depending as it did on a careful evolution of the logic imposed by the existing bricks, rather than precision of expression. Follow-through marks were available for those who concluded the colour of Ckl incorrectly in part (c). Solutions which only offered 5 numbers were assumed to have omitted the existing bricks, and marked as such.
- (f) This question was rarely answered completely – an additional layer of difficulty being imposed by the need to exhaust all the options, with no limit being offered in the text. A systematic approach was needed to include all of these. Most candidates offered only four of the eight options.

## Question 2

This question required candidates to wield and explore a more involved logical mechanism than that of **Question 1**; the question also required candidates to consider the patterns of behaviour of travellers as a proportion or probability, which many candidates found challenging. The mathematical tools for quantifying the likelihood of certain outcomes from a collection of equally likely alternatives is expected in the Problem Solving paper, and is clearly something that students have trouble mastering.

- (a) This processing task was completed successfully by most candidates. A small minority of candidates did not appreciate that it was asking for the **change** in cost.
- (b) This question was not answered correctly by many candidates. The terminology of probability appeared to confuse some candidates, who were tempted to offer qualitative answers (for instance, 'highly unlikely'). Of those who offered a numerical answer, many suggested  $\frac{1}{2}$ , or  $\frac{36}{37}$ . The former answer revealed a misconception about what alternatives were to be treated as 'equally likely' in the proportional reasoning. The latter probably represented an intelligent guess. A small number of candidates may have missed out on marks just because of clumsy rounding here: as a rule, candidates should write down the precise solution to any calculation (a fraction being the recommended format), before rounding to three significant figures if necessary.
- (c) This question was tackled substantially better than part (b). Solutions did not have to be represented as an inequality, and inappropriate limits were condoned, so long as the limits were the same at both 'ends'. The most common misconception was to consider one of the limits to be \$18.
- (d) This question required candidates to structure the alternatives clearly, and very few candidates managed to gain both marks. An algebraic approach was not necessary, although it may have been the least taxing, since it did allow for the pieces of the 'puzzle' to be expressed individually. A number of candidates appreciated that the comparative changes of \$11 and \$12 were at the heart of the problem, but were not able to deduce the correct answer from this.
- (e) This processing task was completed fairly well by most candidates. The most common error was to consider the 76 Singles sold in pairs as 76 Singles – which attracted one mark.
- (f) (i) (ii) These questions were answered fairly well by most candidates. Very little working was shown, and it was not easy to diagnose the misconceptions occurring behind erroneous answers. Follow-through marks were available for those who treated the 76 pairs as 76 Singles in (ii).

## Question 3

This question invited candidates to consider an evolving economic situation, as a businesswoman estimated the profits to be made by employing extra staff. The proportions of time required to sculpt the products, maintain the operation, and oversee other staff were best dealt with in fractions, and a number of candidates undermined their work processing the different costs and times by rounding erratically and disproportionately. Many candidates would clearly have benefitted from further acclimatisation in the use of fractions, and a consistent approach to rounding – as mentioned above, the general rule should be that all answers are given precisely before rounding, AND that rounding should not be done amidst calculations (or at least it should not be one without considering the consequences).

- (a) The opening question was aimed at confirming the essential relations of time, money and number of commissions for candidates: and in particular to recommend the calculation of the number of commissions in order to calculate the profit. Both calculations (the product and the quotient) were

needed to gain the marks here, although there were a number of ways of presenting this – for instance by considering the sculpting work and unskilled work separately. Most candidates completed this successfully.

- (b) This question introduced candidates to the calculation of profits, given incomplete commissions. The most common error here seemed to stem from not appreciating that the example in the preceding paragraph was an **example** of an appropriate fraction, rather than a rule (the misconception being that all partial jobs should be considered as half done). Many candidates showed their working clearly for this question, and in the following questions, and were awarded for their care and clarity. The key element which enabled partial marks to be awarded was the calculation of the number of commissions being considered in each case: an unambiguous record of this (use of the word ‘commissions’ being the most advisable!) often salvaged solutions which had lost their way amidst the processing, or lost all definition due to inappropriate rounding.
- (c) This question was technically harder than (b), since it required some consideration of inverse operations. Working was much less well organised and hence gained fewer partial marks. A few candidates attempted to tackle this question by trial and improvement methods – but most appreciated that a precise answer could be reached more efficiently by considering the inverse operations required.
- (d) This question mirrored the requirements of (b), but required candidates to appreciate how the supervision of artisans affected the number of commissions possible in a given month. The key element of any solution which enabled the award of partial marks was the number of commissions – and most of those who attempted to calculate this were awarded at least one mark.
- (e) Although this question did not explicitly ask for supporting working, some visible working was necessary for the award of both marks here. This reflects the instruction on the front of the exam paper: ‘marks may be lost if working needed to support an answer is not shown’. As with (b) and (d), the calculation of the number of commissions was essential to the logic of this.
- (f) This open-ended optimisation question, which naturally drew together the threads considered in the questions so far, was tackled with much less success than the preceding parts. This was partly due to the appreciation of how many unskilled artisans it was possible to employ, which was essential to a correct answer: the fact that each artisan requires 12 minutes of supervision per hour placed a limit of 5 on Claudel’s business. Candidates who showed appropriate working for alternative numbers of artisans were awarded partial marks, but the four constituent parts of the calculation had to be unambiguous.

#### Question 4

The ‘complex data’ question required candidates to consider how ‘words’ could be constructed from a set of components, with the existence of wild cards and bonus cards complicating the issue. The potentially dizzying array of permutations invited candidates to classify the cards, although this was not strictly required (and may have left little trace on the candidates’ answer booklets). Many of the questions required a combination of straightforward searching with a consideration of basic permutations.

- (a) Most candidates found this introductory processing question accessible.
- (b) This question was not really an optimisation question, since the required prize money was stated, and candidates needed only to go through the list calculating the total value of any states which seemed viable (given the inclusion of the \$100 bonus). The vast majority of candidates managed this correctly.
- (c) This question required candidates to narrow the search space down to those states which included –O–A (there are only three), and then choose the maximum. Half the candidates managed this correctly: a substantial minority managed to identify the state but not the amount of prize money (which was awarded no marks).
- (d)(i) The search requirements were less clear here – it was certainly easier to identify which states could be made from Wild Cards (10 of the 16), and then to strike out components which appeared in the Prize Card list. This left only NEVADA. Most candidates managed this correctly.

- (ii) This questions involved a greater dependence on the logic of permutations than systematic search. Consideration of those states beginning with A or M yielded the correct answer – MONTANA. Most of those who attempted this question stated this correctly.
- (e) This question required the same approach as (b), and was completed equally well. Arithmetic errors were probably the source of most of the solutions not gaining three marks here.
- (f) (i) (ii) Both of these questions were best tackled by permuting the cards that Tex and Carol each had until a viable state was found. Full marks were awarded for any viable claim (whether optimal or not). The most common error here was to assume that Tex could use both Bonus Cards (yielding \$390), which was awarded no marks.
- (g) Most candidates arranged Tex and Carol's cards into a collection states with little evidence of a system. This led to a variety of plausible answers, some of which re-used cards, and most of which were not optimal – which were awarded one or two marks.
- (h) There was some evidence of a systematic approach to this question – but no working was needed to gain full marks in this case. Although there were 15 different beginnings to the states listed, that list included VERMONT, and hence the correct answer of 14. Those who attempted to consider the endings had to remove NEVADA (achievable only by using a Wild Card) and MONTANA.

# THINKING SKILLS

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Paper 9694/41  
Applied Reasoning

## Key Messages

- The first question in this paper tested the candidates' ability to evaluate claims based on statistical data.
- In **Question 2** candidates had the opportunity to display their ability to analyse the structure of a reasoned argument.
- In **Question 3** candidates only gained marks if they identified weaknesses in the reasoning within the document.
- **Question 4** allowed candidates to use a full range of critical reasoning skills in order to construct a reasoned argument using information from the documents.

## General Comments

There was little evidence of candidates running out of time on this paper. A smaller than in previous sessions, but still significant, proportion of candidates are writing answers whose length does not reflect the mark allocation – responses to **Question 1** should be considerably shorter than those to **Question 4**. The handwriting of some candidates was so poor that it was sometimes difficult to award marks because of uncertainty about what the candidate had written.

The standard of candidates varied and there was evidence that many candidates had been taught some of the language of reasoning and some were familiar with the format of the paper. Indeed, some candidates appeared particularly well-prepared in this regard and answered **Question 4** first, attempting to ensure that the most creditworthy question was not rushed. While there are merits to this strategy, it is often useful to tackle **Questions 2** and **3** before **Question 4** in order to develop a deeper understanding of the topic, and the structure and shortcomings of Document 1.

## Comments on Specific Questions

### **Question 1**

Candidates were asked to criticise some realistic data about blood cholesterol and the risk of heart disease, linked with a claim about dying sooner if you eat lots of cholesterol. Many candidates gained between 1 and 3 marks, by recognising that the data made no reference to death or time of death and that association does not mean causation. Fewer noticed that the data did not mention dietary cholesterol at all. As ever, a large number of candidates questioned the source of the data or criticised a perceived lack of detail, for which no marks were available.

### **Question 2**

Candidates who had been prepared for the examination found getting marks in this question relatively straightforward. As always, some candidates did not understand what was required of the task and attempted to paraphrase, summarize or criticize the argument. Often candidates came close to achieving a mark but wrote more than the single argument element required; for example, many candidates quoted the counter-assertion and the main conclusion and labelled it 'conclusion'. Despite the rubric's not mentioning reasons, several candidates framed their analysis in terms of reasons and main reasons. Successful candidates identified parts of the text, copied them out and labelled them as MC, IC or CA.

### Question 3

Evaluation of the argument was relatively straightforward; well-prepared candidates often scored 5 or more and some gained full marks. Where marks were awarded it was usually for identifying the appeal to tradition in paragraph 1, the *ad hominem* attack on the judges or the slippery slope in paragraph 4. Several candidates made reference to the several questionable assumptions but often found it difficult to express the assumption well enough to achieve 2 marks. Many candidates were aware that there was something wrong in paragraph 6 but few were able to explain the straw man to a creditworthy extent. As ever, many candidates simply stated a series of counter-assertions to the claims made in the document and received no credit. It was clear that a large number of candidates had no idea what is meant by the term *assumption*.

### Question 4

The majority of candidates found the subject matter accessible and many had strong opinions. This helped the weaker candidates construct focused arguments. The strongest candidates discussed the concept of fairness and introduced examples of their own to back up ideas in the documents. As ever, many made no critical comments about the documents they were using, and only a minority of candidates seemed to be using one document to contrast with or support another. Thus, marks in the 'use of documents' skill area were often limited.

Fewer candidates than usual answered the question by discussing each document in turn rather than structuring their answer as an argument, which meant that it was easier to award marks in the 'structure' skill area. The best responses clearly stated their conclusion at the beginning. This was then followed by a series of paragraphs, each of which contained a strand of reasoning referenced from the documents, illustrated with their own example and introduced or finished off with an intermediate conclusion. At some point one or more counter-arguments were presented and refuted. While it was pleasing to see the majority of responses offer some sort of conclusion, a few candidates avoided the conclusion they were asked to argue for, or against, and instead argued for a 'soft' compromise position – i.e. risk-based pricing based only on past history but not on belonging to any pre-defined 'group'. Responses such as this could not be credited fully as they did not answer the question that was asked.

# THINKING SKILLS

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Paper 9694/42  
Applied Reasoning

## Key Messages

- The first question in this paper tested the candidates' ability to evaluate claims based on statistical data.
- In **Question 2** candidates had the opportunity to display their ability to analyse the structure of a reasoned argument.
- In **Question 3** candidates only gained marks if they identified weaknesses in the reasoning within the document.
- **Question 4** allowed candidates to use a full range of critical reasoning skills in order to construct a reasoned argument using information from the documents.

## General Comments

There was little evidence of candidates running out of time on this paper. A smaller than in previous sessions, but still significant, proportion of candidates are writing answers whose length does not reflect the mark allocation – responses to **Question 1** should be considerably shorter than those to **Question 4**.

The standard of candidates varied and there was evidence that many candidates had been taught some of the language of reasoning and some were familiar with the format of the paper. Indeed, some candidates appeared particularly well-prepared in this regard and answered **Question 4** first, attempting to ensure that the most creditworthy question was not rushed. While there are merits to this strategy, it is often useful to tackle **Questions 2** and **3** before **Question 4** in order to develop a deeper understanding of the topic, and the structure and shortcomings of Document 1.

## Comments on Specific Questions

### **Question 1**

Candidates were asked to criticise an estimated annual figure based on extrapolation from a small number of schools over a one-month period. Many candidates gained between 1 and 3 marks; the three most commonly-awarded marks were for issues around the quality of the 'cheaper' items, and the assumptions that the month in question and the sample of schools were typical. Many candidates noticed a discrepancy between \$5 000 000 and \$4 800 000 but very few explained that this might have been a deliberate exaggeration. A large number of candidates questioned the source of the data or criticised a perceived lack of detail, for which no marks were available.

### **Question 2**

Candidates who had been prepared for the examination usually gained some marks for this question, often for identifying the main conclusion and one or more of the counter-assertions. As always, some candidates did not understand what was required of the task and attempted to paraphrase, summarize or criticize the argument. Successful candidates identified parts of the text, copied them out and labelled them as MC, IC, etc.

### **Question 3**

Evaluation of the argument was more challenging than in some other sessions and even those candidates who had learned some Critical Thinking rarely scored more than three marks. Where marks were awarded it was usually for identifying the *ad hominem* attack on the Dean, certain of the assumptions or the appeal to



pity. It was rare to award any of the other points on the mark scheme. As ever, many candidates simply stated a series of counter-assertions to the claims made in the document and received no credit.

#### **Question 4**

The majority of candidates found the subject matter accessible and most had strong opinions. This helped the weaker candidates construct focused arguments. Some candidates were using ideas of their own but the vast majority stayed close to the documents. As ever, many made no critical comments about the documents they were using, and this session few candidates seemed to be using one document to contrast with or support another. Thus, marks in the 'use of documents' skill area were often limited. Fewer candidates than usual answered the question by discussing each document in turn rather than structuring their answer as an argument, which meant that it was easier to award marks in the 'structure' skill area. While it was pleasing to see the majority of candidates offer some sort of conclusion, a disappointing number are avoiding the conclusion they are asked to argue for, or against, and instead arguing for a 'soft' compromise position. Responses such as this could not be credited fully as they did not answer the question that was asked.

# THINKING SKILLS

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Paper 9694/43  
Applied Reasoning

## Key Messages

- The first question in this paper tested the candidates' ability to evaluate claims based on statistical data.
- In **Question 2** candidates had the opportunity to display their ability to analyse the structure of a reasoned argument.
- In **Question 3** candidates only gained marks if they identified weaknesses in the reasoning within the document.
- **Question 4** allowed candidates to use a full range of critical reasoning skills in order to construct a reasoned argument using information from the documents.

## General Comments

There was little evidence of candidates running out of time on this paper. A smaller than in previous sessions, but still significant, proportion of candidates are writing answers whose length does not reflect the mark allocation – responses to **Question 1** should be considerably shorter than those to **Question 4**. The handwriting of some candidates was so poor that it was sometimes difficult to award marks because of uncertainty about what the candidate had written.

The standard of candidates varied and there was evidence that many candidates had been taught some of the language of reasoning and some were familiar with the format of the paper. Indeed, some candidates appeared particularly well-prepared in this regard and answered **Question 4** first, attempting to ensure that the most creditworthy question was not rushed. While there are merits to this strategy, it is often useful to tackle **Questions 2** and **3** before **Question 4** in order to develop a deeper understanding of the topic, and the structure and shortcomings of Document 1.

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### **Question 2**

Candidates who had been prepared for the examination found getting marks in this question relatively straightforward. As always, some candidates did not understand what was required of the task and attempted to paraphrase, summarize or criticize the argument. Often candidates came close to achieving a mark but wrote more than the single argument element required; for example, many candidates quoted the counter-assertion and the main conclusion and labelled it 'conclusion'. Despite the rubric's not mentioning reasons, several candidates framed their analysis in terms of reasons and main reasons. Successful candidates identified parts of the text, copied them out and labelled them as MC, IC or CA.

### Question 3

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Fewer candidates than usual answered the question by discussing each document in turn rather than structuring their answer as an argument, which meant that it was easier to award marks in the 'structure' skill area. The best responses clearly stated their conclusion at the beginning. This was then followed by a series of paragraphs, each of which contained a strand of reasoning referenced from the documents, illustrated with their own example and introduced or finished off with an intermediate conclusion. At some point one or more counter-arguments were presented and refuted. While it was pleasing to see the majority of responses offer some sort of conclusion, a few candidates avoided the conclusion they were asked to argue for, or against, and instead argued for a 'soft' compromise position – i.e. risk-based pricing based only on past history but not on belonging to any pre-defined 'group'. Responses such as this could not be credited fully as they did not answer the question that was asked.