

# THINKING SKILLS

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Paper 9694/21  
Critical Thinking

## Key Messages

- Candidates and teachers are advised to study mark schemes for past papers, in order to see what they need to do in order to score high marks for **Questions 1d, 2d, 3b and 3c**.
- Candidates should avoid speculation.

## General Comments

There were a few good and a few poor answers, but not many candidates were consistently strong or weak. So, overall, many candidates were close to the middle of achievement.

Some answers were not credited because they were based on speculation. For example, answers to **1(b)** and **1(c)** which speculated that the tutor and Senior Counsellor respectively **might** have been friends with Barbara were not credited, because no evidence was given to suggest that they were; but it was valid to state that the tutor had a vested interest to portray Barbara in as good a light as possible, because that was implicit in her role and in the nature of a college reference. Similarly, **Question 2(c)** was intended to focus on information given in the source, not on factors which **might** have been true for all we know.

## Comments on Specific Questions

### Question 1

- (a) Many candidates showed that they knew the specialized meaning of “argument” in Thinking Skills and clearly explained how this reference qualified as such. A few candidates were awarded 1 mark on the basis of a generic explanation. Candidates who were awarded 0 marks usually said it was *not* an argument because it did not include a disagreement or expressed only one side, which apparently referred to the everyday meaning of “argument” rather than the technical meaning. A few candidates thought that a reference could not be an argument, and then claimed that it did *not* have reasons or a conclusion.
- (b) Most candidates recognized that because the reference was good it did not explain why Barbara lost her job, but only a few went on to make the crucial point that this is still useful information because it supports the hypothesis that the alleged reason for her dismissal was not true. Many candidates recognized that the usefulness of the reference was reduced by being biased in Barbara’s favour.
- (c) A good number of candidates recognized that the Senior Counsellor’s perspective was limited, because she had heard only one side of the story, and a fair number also pointed out that Barbara’s own account was liable to be biased in her own favour. Answers based on speculation (such as that the Senior Counsellor had a grudge against Diana or had formed a friendship with Barbara) were not credited. Answers which focused on one stage of the process (Barbara’s account to the Senior Counsellor or the email from the latter) were capped at 2 marks. Some candidates raised the issue of whether the e-mail breached the confidentiality of the interview between Barbara and the Senior Counsellor, but that is not relevant to its *reliability*.
- (d) There were some good summaries of evidence that Barbara was competent/not at fault, and of the reasons to suspect either malice from Diana or a desire to save money. Some candidates thought that Barbara was wrong to refuse the request to do shopping. Others missed the significance of the fact that Diana and the Office manager were both volunteers, and thought that either or both of them might feel threatened by Barbara’s competence and in fear of their own jobs. Most

candidates took the sources at face value, without evaluating their credibility, but in order to achieve 5 or 6 marks out of 6 it was – as always – necessary to use the sources with some critical distancing.

### Question 2

- (a) There were several valid points that could be made, and most candidates identified at least one of them, but not many achieved 3 marks out of 3. Some candidates thought both sources were saying that swearing has increased, but in fact only Source B makes that claim. Several candidates misread Source B as claiming that swearing is most common in a group.
- (b) Most candidates achieved at least 2 marks for this question, but many of them did not score more because they gave two reasons why swearing has increased rather than two reasons why it is being tolerated by teachers. The fact that swearing has increased in society in general is one answer to the question, but not two answers. Quite a lot of candidates mistakenly inferred that “Shut up” counts as swearing.
- (c) Nearly all candidates got at least 1 of the 2 marks for this question. Many got the point about age, and a few talked about intelligence or English as a first language. Other answers commented on an unrepresentative mix of ethnicities, cultures (which might affect your attitude to swearing) or different climate (which might affect one’s ability to tolerate cold water). Answers which were not credited were comments about the sample size being too small, speculation about whether the genders were balanced in the sample and comments to the effect that tolerating cold water could not be generalised to tolerance of pain in general (which is a plausible point, but does not answer the question).
- (d) Overall, this question was done well. Most candidates at least made some appropriate use of Sources A and D, and a good number made evaluative comments which showed they were not taking them at face value. Some of the arguments based on Source B were circular, such as “swearing is bad because there has been an increase in children swearing”, which begs the question. A significant number of candidates argued strongly against swearing, especially taking God’s name in vain, but they tended to under-estimate the points made in Sources A and D.

### Question 3

- (a) Very few candidates correctly identified the main conclusion, but a fair number identified the main IC, which was awarded 1 mark. The IC of the final paragraph looked at first sight like a main conclusion, and many candidates identified it as such, but it was not supported by the first three paragraphs – in fact, some candidates criticised the argument on those grounds in their answers to part (c).
- (b) Many candidates correctly identified at least one of the main reasons, but there were also a lot of incorrect answers. Candidates need to realize that they have to distinguish between reasons which support an intermediate conclusion, and reasons which support the *main* conclusion (which are nearly always the same as the intermediate conclusions themselves).
- (c) As shown in the indicative content, there were a lot of critical points which could have been made, but a lot of answers did not spot any, or at best hinted at one of them. Although the question refers to *unstated* assumptions, candidates still quoted statements from the passage and called them assumptions as a way of disputing them. In everyday English usage people do call a claim which is not backed by evidence an “assumption”, but that is not the meaning attached to the word in Thinking Skills. Other points which were commonly seen but not credited were paraphrases of part of the passage simply being labelled as “strengths”, and claims that a lack of evidence or statistics is a “weakness”. It is also not a weakness that an argument favours one side of a question – indeed, that is usually the purpose of an argument.
- (d) Most candidates argued that the study of history *does* have value. The most popular line of reasoning was that history repeats itself, and *therefore* it helps us to avoid the mistakes of the past, *and therefore* enables us to plan for the future (though only a minority managed to develop the point in this way with clear intermediate conclusions.) Other popular valid reasons were the need to appreciate our culture and where we have come from, and the idea that advances in science and medicine would not be possible without a knowledge of what has already been discovered. There were many well-chosen examples from candidates’ own national backgrounds. Some

candidates lost marks by arguing in favour of the importance of history (i.e. the past) rather than of the **study** of the subject. A few candidates scored 1 or 0 because their comments did not constitute an argument or because they discussed the passage instead of the claim. As on previous occasions, the subject of the claim was connected to the passage, but distinct from it, with the intention that candidates should write their **own** arguments. Fewer arguments on this occasion were capped at 3 marks because they argued to the wrong conclusion or left the conclusion unstated.

# THINKING SKILLS

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Paper 9694/22  
Critical Thinking

## Key Message

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. Such candidates also tended to spend too much of their time re-iterating what is in the sources and this also cannot receive any credit, apart from **Questions 3(a)** and **(b)** where they are required to stick closely to the text.

## General Comments

Well-prepared candidates were able to access higher marks in **Question 3**, with a number of examples of full or near-full mark answers. However, this was counterbalanced somewhat by such candidates finding **Question 1** slightly more difficult. Most candidates seemed to respond to the issues raised by the questions and were able to cope with the content of the sources. A significant minority of candidates who do well on the first three parts of **Questions 1** and **2** often spent too little time on part **(d)** where a fuller answer is required. Also, a significant number of candidates were held back by not moving beyond the obvious superficial response to a question. For example, in **Question 1(c)** the superficial response that it is significant because Fiona Templeton is a creative artist does not dig deep enough to get beyond 1 mark. Candidates need to realise that if the answer they give is a very obvious response in the light of the question and the source to which it refers, then they probably need to go further to gain more than 1 mark.

## Comments on specific questions

### Question 1

- (a) This was not very well-answered, with only a minority of candidates pointing out that the theory here is not relevant to very specific incidents and vocabulary being used, as is the case in plagiarism. Many candidates simply said it was relevant as it suggested plagiarism was unavoidable or words to this effect.
- (b) This was answered better, with many candidates suggesting that key information would be that Fiona Templeton knew about the incident, being a childhood friend of Daisy Price. Those tackling the question of the timing of the writing often talked about *publication* date, and this could not be credited as the extract clearly states that Price's book was published before Templeton's. Candidates tackling the question in this way needed to see that publication date is not necessarily the same as the date a manuscript is submitted. Most candidates realised that *additional* information was needed here though a minority incorrectly tried to identify information already given in the sources.
- (c) As noted above, this was not done particularly well, with very few candidates pointing out that the issue here is one of a *conscious* act and so anything about *unconscious* influence is not significant. Rather more did make the point that what is relevant to musical composition might not be relevant to writing – though not as many as one would have hoped, given that it is a fairly obvious point.
- (d) The issues raised seem to engage the candidates. Candidates were fairly evenly split between those who argued Templeton did plagiarise and those who argued she did not. Good answers showed scepticism towards the idea that Templeton did not know about Price's book. Equally, they pointed out that we would need to have rather more information about the rest of the book to make a reliable judgement. Only a minority of candidates pointed out that the expert evidence in Sources A and F do not really help very much because they lack relevance to this particular case.

## Question 2

- (a) This question discriminated well between candidates, rewarding those with good critical thinking ability. Weaker candidates tended to argue that we could conclude that they did not wear cycle helmets. If they said that we could not conclude this, it was for irrelevant reasons like sample size etc. Good candidates saw that an opinion about the effects on the general population of a law making helmets compulsory does not give any grounds for thinking they do not think it is a good idea to wear a cycle helmet to protect the head.
- (b) Candidates found this question difficult, often re-iterating the case for buying the best available helmet – for which no credit could be given as it simply repeated what had already been said. Other candidates discussed whether price was related to quality but this overlooked the question's reference to the 'best available cycle helmet even if it costs more'. This was intended to bracket quality and price together. A minority of candidates managed to develop a case for buying a cheaper/poorer-quality helmet in relation to risk, cycling environment etc.
- (c) This question was answered well, with many candidates gaining 3 marks by identifying such factors as the amount of cycling that the helmet-wearers did in comparison to the non-helmet-wearers and the nature and severity of the injuries.
- (d) Whilst Level 3 answers were rare, many candidates managed to reach Level 2 by weighing up the information in the sources. Only a small minority used Source D to suggest this pointed to a problem with drivers rather than cycle helmets; most saw it as evidence against wearing cycle helmets. Good answers pointed out that the expression 'a significant contribution' needed some exploration: on the one hand, if most injuries were not to the head one could argue that the contribution was insignificant; on the other hand, if, as seems likely, injuries to the head were more severe/life-threatening, then the contribution would be significant even if such injuries were in the minority.

## Question 3

- (a) Many well-prepared candidates managed to correctly identify the conclusion. However, weaker candidates added the reason ("It is important we follow the advice of medical experts") meaning they only got 1 mark. A significant minority of poorly-prepared candidates identified one of the other reasons as the main conclusion.
- (b) The well-prepared candidates managed to identify 3 reasons and virtually all candidates managed to identify at least 1. The reason in Paragraph 4 seemed to be the one that caused most difficulty.
- (c) A pleasing number of candidates showed an awareness that the crucial thing in this question is to *evaluate the reasoning* rather than to *challenge the propositions* that constitute that reasoning. This meant there were significantly more 5-mark answers than in previous years. However, **Question 3** in general, and this part in particular, exposes a noticeable divide between those candidates who understand the nature of the paper and those who do not. This meant the range of marks on **Question 3** was from 0–15.
- (d) Candidates seemed engaged with this topic and put forward interesting and often detailed reasons to support their conclusion. However, a large number of even good candidates tended to support the conclusion that water is an *important* resource rather than the *single most important* resource, which cost them a mark or two. Candidates who argued that it was not the most important resource and that other resources were equally important managed to avoid this trap, but they were in a minority in taking this line of reasoning.

# THINKING SKILLS

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Paper 9694/23  
Critical Thinking

## Key Message

Candidates and teachers are advised to study mark schemes for past papers, in order to see what they need to do in order to score high marks for **Questions 1(d), 2(d), 3(b) and 3(c)**.

## General comments

Overall, there was a wide range of achievement on this exam.

## Comments on specific questions

### Question 1

Candidates engaged well with this story.

- (a) Nearly all candidates recognized that Charlotte's evidence was not reliable. A fair number of candidates identified the most important reason for this unreliability, namely her vested interest to avoid incriminating herself. The inconsistencies between the attitudes expressed in Source C and those in Charlotte's email (Source F) were a popular answer and were credited, even though if she really had been subject to undue influence from Brian, it might have influenced the email.
- (b) A lot of candidates recognized that Mrs Cruz's vested interest to defend her daughter severely reduced the reliability and thence the usefulness of her evidence, but many over-estimated its overall usefulness. Quite a lot of candidates took the evidence at face value, and claimed that it gave valuable information about the respective characters of Charlotte and Brian, but this was not credited.
- (c) Very few candidates realized that the occasion when Charlotte and Brian visited must have been on an earlier date than Charlotte's email (Source F), and that if the email was trustworthy then the knife was not stolen on the occasion of the visit. Many candidates recognized that Mrs Cruz might have been defending her daughter, with implications for Charlotte's guilt, but only relatively few saw that she probably would have reported it if she had really suspected Brian, and that he therefore probably did not steal the knife.
- (d) Almost all candidates judged that either Charlotte or Brian was responsible for the murder. Charlotte was the most popular answer, which is supported by the weight of the evidence. In order to be awarded 5 or 6 marks out of 6, it was necessary both to use the sources critically and to consider more than one solution, but – as on previous occasions – not many candidates did this.

### Question 2

- (a) Very many candidates achieved 2 or 3 marks for this question, by recognizing the vested interest of the authors to increase sales of their dietary supplements and/or the basis of the statistics in self-reporting, but very few spotted that the reliability was enhanced by the moderate nature of the precise claims. Some candidates answered on the assumption that the dietary supplements were designed to help purchasers lose weight – a misunderstanding which they might have avoided if they had read all the sources before answering part (a).
- (b) Nearly all candidates recognized that Source C was not an argument, but they varied considerably in how well their justifications showed an accurate understanding of the technical meaning of the

word “argument” in Thinking Skills. 0, 1 and 2 marks were all awarded to significant numbers of candidates.

- (c) The meaning of “joint age” implied by the report was so obvious to most candidates that they had very little sympathy for the author of Source C; many implicitly agreed with the candidate who described him as “*just a confused old man.*” So although most candidates scored 1 mark, for showing some understanding of what the term meant, not many achieved more. Some candidates evaluated other parts of the comments, not just the part cited in the question, but this was not credited.
- (d) A lot of candidates did well on this question, a fair number achieving 6 marks out of 6. In order to achieve a high mark, it was necessary to recognize the ambiguity in Source E, which claims that fish oil can be useful in alleviating the symptoms of some conditions, but not others, and can also be dangerous in excess. It was also necessary to recognize that Sources A and D implied that fish oil would be beneficial, but were written by a company with a strong vested interest to promote sales of their products.

### Question 3

- (a) A good proportion of candidates correctly identified the main conclusion of the argument.
- (b) There were only four reasons directly supporting the main conclusion, but a fair number of candidates correctly identified two or three of them. Some candidates offered paraphrases instead of quoting from the passage: these were not credited unless they were very close to the original wording.
- (c) As on previous occasions, quite a lot of candidates scored 0 marks because they attempted the wrong task, by summarizing the passage, giving a literary critique or expressing their own opinions on the subject. On the other hand, there was an increase in the proportion of candidates who did understand what was required and even had some knowledge of technical vocabulary – for example, a significant number correctly identified the *ad hominem* argument in paragraph 3.
- (d) Nearly all candidates had something to say about the value of education, but many did not focus on the precise claim in the question, ignoring the implications of “everyone” and “deserves”. Some candidates offered a string of opinions instead of an argument, some of them using the claim as the starting point of their discussion instead of its conclusion.

# THINKING SKILLS

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

- Candidates should ensure that they study all the details in the questions and examples very carefully, so that they have all the conditions for the problem clear in their minds in order to tackle the questions successfully.
- It is very important that candidates lay out their working in a clear and orderly fashion. Marks will often be awarded for clear evidence of good problem-solving methods, even if the final solution is not arrived at. When candidates are not confident of obtaining the full solution, they should be aware that they may gain credit for showing that they understand some aspects of the problem, if not all.

## General Comments

This paper required candidates to engage in the full range of problem-solving skills: the questions involved careful reading of the text laying out each problem's structure, some experimental investigation of the options, and considered reflection on what best fitted the question's requirements. Although 36 of the 50 marks could be won with a brief, unsupported answer, there was a great incentive for candidates to show their working: there were 20 marks available for sensible working which led to an incorrect final solution to a part of a question. 14 of the marks available required an appropriately expressed explanation, or a more detailed answer. Although some candidates clearly suffered because they misallocated their time, most attempted all four questions. Candidates' answers to **Question 3** tended to garner the most marks, and **Question 1** delivered the least, in general.

## Comments on Specific Questions

### **Question 1**

This question required candidates to predict where the shadows of the squares would be cast on the screen, using a diagram, or by applying their knowledge of vectors, or of mathematical similarity. It was essential that this logical process was correctly grasped for the candidates to have any success with the problem-solving. No example was given, but the candidates were given a diagram which showed a possible answer to the first question. Very few candidates showed a systematic method for predicting where squares on the different tracks would appear on the screen, and many gave vague, non-quantitative answers to most of the questions.

- (a) The easiest way to tackle this question was to consider the plan view of the tracks, and infer the length of one side of the square using similar triangles. Some candidates clearly attempted to use the ratio of lengths (4:2:6) and jumped to erroneous conclusions about the size of the shadow on the screen (for instance, that it would be twice the size of the original).
- (b) A successful answer to this question depended on candidates appreciating the ratio of the distances between the track and the screen (1:2) and then gauging when an object in track 1 would cast a shadow on the edge of the screen. Some candidates accomplished this by dividing the distance between the centre and the edge of the screen by 3, and concluding that the square must be  $(10.5 - 3.5 =) 7$  m from the left hand edge. The other alternatives were to sketch a plan of the relevant area, or (informally) use vectors. This question was answered correctly by only a few candidates.
- (c) A similar analysis was needed as for part (b), but directed at the position of squares in track 2. This clearly depended on confident use of the ratio of distances between the tracks. Most candidates



struggled to display the inter-relationship between the tracks in adequate detail to address this question.

- (d) This question required candidates to deduce how  $12 \text{ m}^2$  could be created using two squares, and then consider possible overlapping positions. Greater precision was required in order to confirm the position of the track 2 square, and very few candidates managed a correct solution as a result.
- (e) (i) Most candidates who attempted this question took it as an invitation to bend the rules; in particular, to consider squares of different lengths, and tracks at different distances from the screen. The relevant rules given at the beginning of the question apply throughout unless explicitly waived for a sub-question.
- (ii) The final part of the question could be attempted without reference to the vectors and ratios that the previous parts depended on. The combinations of square numbers alone would have led candidates to the conclusion that an area of 3 was the smallest that was impossible. Accompanied by basic working this was awarded 1 mark. The fact that 3 units was possible by throwing a shadow on the edge of the screen (e.g. a square which is 5 m from the left of track 2 only leaves  $\frac{3}{4}$  of its shadow on the screen) enables all the areas up to and including  $10 \text{ m}^2$  to be displayed.

## Question 2

This question required candidates to consider the overlapping averages created by the digits representing pixels, and to experiment with possible underlying data. Although it seems likely that the process of pixellization may well have been unfamiliar to many candidates, most were able to engage with its logic, and experiment with the problems considered as the question developed. The provision of an example allowed candidates to check that their interpretation of the logical rules was correct.

- (a) Completion of the instructions defining pixellization was achieved correctly by most candidates – the most common mistake being the failure to round down once the mean was calculated.
- (b) The reversal of the pixellization process, and the necessary speculation involved, required candidates to develop a basic understanding of how the combinations were restricted by the total: those who merely guessed a value and checked it was possible, but not that it was optimal, tended not reach a correct answer.
- (c) The overlapping restrictions created by moving pixellization offered candidates a wealth of possible approaches – most commonly ‘trial and improvement’, followed by an algebraic approach. A number of candidates managed to express the inequalities algebraically, but then struggled to solve them – which gained partial marks.
- (d) About half the candidates offered a numerical list (as was intended) in answer to the question; the remainder gave descriptive responses or none at all. Although some candidates offered solutions which involved pixels other than 0 and 15, most engaged appropriately with the evolving logic of the question, appreciating that 3\_3\_3\_3 must reflect only one ‘15’ in the first four pixels. Some candidates gave answers with more or less than 12 numbers, which were difficult to assess – candidates are advised to scrutinise their answers for potential ambiguity wherever possible.
- (e) (i) This question required candidates to experiment with binary patterns, in search of one fitting the requirements. There was a great variety of suggested solutions, and a number of candidates managed to find a pair of appropriately asymmetrical 4-letter sequences (the simplest being 15\_0\_0\_0 and 0\_0\_0\_15).
- (ii) A small number of candidates managed to look beyond the 8-letter sequences, and find a 6-letter sequence which fitted the requirements (such as 15\_0\_15\_0\_0\_15).

## Question 3

This question required candidates to consider a pair of inversely related rates (speed and fuel consumption) and the inter-relationship between them. This was reduced to a ‘discrete’ problem by means of the three road types, and regular distances in between junctions. Success at the question depended on careful calculation of the different variables (distance, speed, time, fuel), and methodical trial and improvement. Many candidates were able to show their working efficiently and unambiguously – which ensured that the

minor numerical errors which often beset candidates' responses to such problems did not harm their scores too much.

- (a) Although there was no worked example to show how the fuel consumption was calculated, this first question enabled candidates to confirm that they were combining the quantities correctly. Most candidates were able to articulate the middle stage of the working (that the car consumed 3 litres every 10 km on the highway), and were awarded the mark. A large number of candidates did this without using words, which was credited as long as the calculations were unambiguous – it is recommended that candidates define the constituent parts of any calculation where they are asked to demonstrate a given answer.
- (b) This question involved a direct following of instructions (take the total distance, remove 20 for highway, divide into thirds, ...) and was completed competently by more than half the candidates. Those who left clear working showing the lengths of the different sections of road were awarded partial marks even if their calculations went awry. The most common error was to divide the 180km between country roads and minor roads, assuming that the 20 km of highway was all that was required – an interpretation that was explicitly discounted in the question.
- (c) This question was the first to abide by the inequality restricting the distances on each of the three roads ( $C > M > H$ ) – and some candidates applied these in the wrong order, or assumed that the inequalities were not strict (i.e.  $C \geq M \geq H$ ). However, the majority of candidates did offer a solution which abided by the restrictions. The choice of optimal solution – maximising the distance on minor roads, and minimising the distance on the highway – was identified by some. Many achieved partial marks for a selection of distances which abided by the restrictions but was not optimal.
- (d) The logical priorities of this question were more demanding than (c), but most of those who submitted a valid solution to (c) also did so for (d). An optimal solution required candidates to appreciate that the maximum distance that could be spent on the highway was 50 km (because  $60 + 70 + 80 > 200$ ), and then to maximise the amount of distance on country roads. This process was clearly more taxing than (c), and far fewer candidates reached a totally correct answer.
- (e) The interaction of the two inversely related rates only became explicit in this question, in which candidates were expected to balance the need for speed and fuel efficiency. The mark scheme was more demanding for this question – requiring candidates to locate a combination which prioritised the distance spent on country roads appropriately. As such it credited those who demonstrated a good strategy as well as mere operational skills.
- (f) The final part of the investigation built on part (e), and required candidates to suggest a permutation of the three road types which would ensure that no individual section was more than 20 km. This was only really attempted by those who had completed (e) with some success – it seems likely that many candidates were put off by the new logical requirement, and left the question due to time pressures.

#### Question 4

This question required candidates to track the scores of two competitors, while filtering the scores for multiples of 3, and keeping a tally of how many digits had been used. As such the data which candidates had to process and analyse was created by themselves (as they list the scores). Many candidates were clearly tempted to list the scores mentally, and such 'efficiency' was strongly correlated with accidental error. This question was completed less successfully than in previous sessions, and this may have been due to candidates taking short-cuts in their working.

- (a) (i) This question was not completed well by the majority of candidates: the initial extraction of the data from the game's rules was not obvious, and many failed to realise that a player could have a maximum of 15 'plays' if the fourth play of any number led to the game finishing. A few candidates checked that the score of zero would not be reached first – but most candidates assumed that 90 plays were possible (i.e. each player playing 1s repeatedly), or began to consider the scores from a particular game. Very few candidates completed this question correctly.
- (ii) Many candidates fell into the trap of adding eight 2-minute intervals to the eight rounds – those who correctly spotted that only seven such intervals would occur were awarded the mark here, irrespective of what time they carried forward from (a)(i).

- (b) This question required a careful listing of the scores, for three turns each, considering the extreme scores that could be played without terminating the game – and was completed successfully by very few candidates. Very few candidates wrote down the possible scores – and it was difficult to see where candidates had made mistakes with any confidence.
- (c) The question was tackled better than (b) by most candidates, although the task was essentially the same – to consider what scores were possible from a given starting point. Although this question did not require candidates to consider what an optimal move was (unlike (b)), it was deeper into the game and therefore required consideration of which numbers had been played before. The main difference, however, was that it asked for a list – and left less to the untrustworthy machinations of ‘mental maths’.
- (d) (i) This question asked for a logical explanation of Lee’s choice – and required candidates to consider what kind of explanation was appropriate. Having stated that the only options that he considered were 1 and 4, it was expected that candidates would focus on why he chose one rather than the other. Such an explanation naturally depended on the difference between the scores he could expect from playing each number. However, there were a multitude of answers to this question (“*because he felt like it*”, “*because he couldn’t play the game properly*”) which did not engage with the strategy and scored no marks. Few candidates managed to offer an answer which referred to the points won in each case, even without the particular scores, and hence few marks were awarded.
- (ii) This question was tackled relatively well. It required candidates to consider Lee’s turns during the game, and to strike off those options which had been played three times. It seems likely that this task was completed on the Question Paper by many candidates.
- (iii) This extended the process begun in (d)(i) and (ii), and required a clear listing of the final numbers played by Lee and Ric. The relative ease of checking for multiples of 3 ensured that this was mainly a test of candidates’ ability to tally the numbers which the players had used, and ensure that no numbers were used too many times. About 10% of the candidates accomplished this correctly.
- (e) (i) This question required candidates to use the total score, given on the diagram at the beginning of the question, and subtract the scores from rounds 1, 2, 3 and 5 to deduce the score in round 4. Very few candidates assembled the appropriate pieces of information – this reflected the difficulty in selecting the previously unused information from earlier in the question, under pressure of time. Little working was shown in answers to this question, and very few candidates gained the partial marks which were allocated to an appropriate statement of the score from round 5.
- (ii) Many candidates offered a solution to this question, but most appeared to be guesswork. The facts that Ric had won round 5, and had won one more round than Lee, allowed candidates to deduce that Ric had won rounds 2 and 3. This result was difficult to secure without a correct answer to (e)(i).

# THINKING SKILLS

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Paper 9694/32

Problem Analysis and Solution

## Key Messages

- Candidates should ensure that they study all the details in the questions and examples very carefully, so that they have all the conditions for the problem clear in their minds in order to tackle the questions successfully.
- It is very important that candidates lay out their working in a clear and orderly fashion. Marks will often be awarded for clear evidence of good problem-solving methods, even if the final solution is not arrived at. When candidates are not confident of obtaining the full solution, they should be aware that they may gain credit for showing that they understand some aspects of the problem, if not all.

## General Comments

This paper required candidates to engage in the full range of problem-solving skills: the questions involved careful reading of the text laying out each problem's structure, some experimental investigation of the options, and considered reflection on what best fitted the question's requirements. Although 39 of the 50 marks could be won with a brief, unsupported answer, there was a great incentive for candidates to show their working: there were 18 marks available for sensible working which led to an incorrect final solution to a part of a question. 11 of the marks available required an appropriately expressed explanation, or some explanatory working. Although some candidates clearly suffered because they misallocated their time, most attempted all four questions. Candidates' answers to **Question 4** tended to garner the most marks, and **Question 1** delivered the least, in general.

## Comments on Specific Questions

### **Question 1**

This question required candidates to consider permutations of positions, and the sums of these positions. The mechanics of the question were deceptively simple: most of the investigation involved simply adding up two, three or five numbers selected from the numbers 1–10. The question required a firm grasp of the two levels of ranking involved (the individual races, and the cumulative results for the whole regatta) – and appreciation that equal rankings were not possible in the individual races, but were possible in the cumulative results for the regatta. A large number of candidates attempted to answer the question without considering the detailed scores (e.g. by appealing to the general rules of the scoring system), and this enabled them to score very few marks – the questions explicitly ask for lists of possible positions, and it should be assumed that consideration of detailed numerical examples is necessary for the completion of such problem-solving questions.

This question was attempted well by very few candidates, which may have been partly due to the counter-intuitive nature of its conclusions: one might imagine that coming 3<sup>rd</sup> in three races guaranteed a rank of 3<sup>rd</sup> overall. Consideration of the examples in this question showed that surprisingly little can be concluded about a crew's overall ranking by considering its race positions alone.

- (a) A correct answer to this question required an appreciation that three sets of ranks were needed, which did not include 3<sup>rd</sup>, and which added up to less than 9. No example was given in the stem of the question, and many candidates did not attempt to offer three triplets at all. It is recommended that candidates offer an attempt at an answer, even if it does not comply to the question's overall requirements, since this can gain partial marks: it also allows candidates to reflect upon what progress they have made in answering the question, and develop a strategy.

- (b) This question required candidates to explicitly appreciate that the key score was 12, and that pairs of numbers summing to less than that had to be found. Candidates who struggled with the first question did not tend to enjoy much success with this one. Some candidates did appreciate that 1<sup>st</sup> and 10<sup>th</sup> did beat 6<sup>th</sup> and 6<sup>th</sup> – but very few then concluded that the optimal pairing in this situation was 1<sup>st</sup> and 1<sup>st</sup>, which left all the other crews scoring more than 12.
- (c) This question developed the structure considered in (a), and most candidates struggled with it. An ordered list of options did yield partial marks here even if incomplete, but few candidates attempted it. The number of options was initially daunting (9<sup>5</sup> options for the first competitor, 8<sup>5</sup> for the next, ...), but consideration of the simplest case (considering permutations of 1, 2, 3, 5 and 6) was all that was required.
- (d) This question considered the best outcomes available, given repeated positions in each race, and thus developed the insights gained in (b). The question required a thoroughly organised assault, using trial and improvement, or appreciation that the average scores of the other crews was the key element in determining whether an overall position of 1<sup>st</sup> was possible.

## Question 2

This question required candidates to carefully unpick the implications of the table of running totals. A correct appreciation of this was critical to gaining any marks in this question. The single example given, of what the figure for May represented, had to be thought through and applied to the other figures. Some initially did this algebraically ( $a+b+c+d = 4$ ,  $b+c+d+e = 1$ , ...) although it soon became clear that the system of simultaneous equations that this produced did not need to be solved by formal methods.

- (a) (i) It should have become clear that the most useful figures on the table were the zeros. Four positive numbers adding up to zero are uniquely defined. Many candidates did appreciate this. It is certainly a useful strategy, when faced with such a mass of information, for candidates to explicitly consider which figures are likely to provide the most extreme solutions, or the simplest solutions.
- (ii) It was not necessary to unpick all the individual figures to answer this question – and many candidates took the example as a basis for adding up the April, August and December figures. The most common incorrect answer involved adding up all the numbers in the row (yielding 106), showing total disregard for the example.
- (iii) This question prompted candidates to gradually unwrap the figures in the table, and work out how many crimes were occurring in individual months. Most of those who succeeded in (a)(ii) also managed this question.
- (iv) This question required a complete understanding of the ‘unwrapping’ process, and only a few candidates managed to solve this correctly. Those who did tended to offer month by month figures from March 2010 backwards.
- (b) The insight which was evoked in (a)(i) was developed in this question – yielding the conclusion that Carradine must have been in jail from December 2011 until May 2012. Little working was shown for this question, and none was needed – but it can be worthwhile transcribing any working written on their question paper onto their answer booklet, if they have not achieved a confident answer.
- (c) This question invited candidates to offer creative reasons for the apparent inconsistency described in the stem. Answers which contradicted what was given (e.g. “Carradine’s behaviour must have changed”) and answers which did not affect the reported crime figures (e.g. “the online mapping scheme was a mistake”) gained no marks. A few candidates gave two answers which were deemed to be repetitive – and only gained one mark. If in doubt, it may be a good idea to offer three suggestions, if a candidate thinks that their two are too close.
- (d) A few candidates appreciated that months with 6 crimes in were the maximum possible, and then appreciated that the months following this had no room for flexibility.

### Question 3

This question required an appreciation of the angles which led to forward and backward movement (by considering the multiples of 45), and a strong grasp of the rates involved (revolutions per second, degrees per second, and frames per second). This latter aspect required discipline in the use of units (revolutions per second, or seconds per revolution?) and careful layout in the investigation. Most candidates found parts **(d)**, **(e)** and **(f)** very difficult to access.

- (a)** This question required candidates to translate the rate (36 frames per second) into an angle, and then compare it with the bullet point categories above. A number of candidates were able to do this.
- (b)** This question required the reverse process to **(a)**: turning an angle into a rate. Most of those who succeeded in tackling **(a)** also succeeded with **(b)**.
- (c)** This question required ordered consideration of the lowest numbers of frames per second, and conversion of their rates into angles. 1, 2 and 4 could be immediately dispensed with; 3 and 5 quickly confirmed 5 as the lowest number yielding backwards movement. Few candidates were able to successfully conduct this miniature investigation; most had probably lost their way between the different rates involved. This is a mathematical area which is certainly worth addressing with candidates preparing for the exam, since it is often counter-intuitive and easy to misjudge (for instance, by inverting a unit).
- (d)** This question involved applying the methods defined in **(a)**, **(b)** and **(c)** to wheels with different numbers of spokes, and different turning speeds. An investigation similar to that in **(c)** is required to establish the optimal answer. A small number of candidates managed to identify the key figures ( $15^\circ$  and  $1/25$  of a second) and then initiate the investigation.
- (e)** This question appeared to develop the analysis of rates on which **(d)** depended, requiring further trial and further improvement – but in fact it could be deduced from the key example reached in **(d)**. If the speed in **(d)** led to ambiguous motion, then speeds just faster and slower would lead to motion in contrary directions. This was tackled by very few candidates.
- (f)** The final question in this sequence invited candidates to consider what numbers of spokes might lead to backwards motion, given a certain frame rate. This was most easily done by considering which numbers of spokes might lead to ambiguous motion. As with other problems involving continuous motion, the problem-solver is advised to choose which are the decisive moments, and then consider the problem discretely.

### Question 4

This question involved a condensed timetable, which candidates needed to consider efficiently and in detail, in order to analyse outcomes and combine with other information. The most reliable way to do this was to list the times at which tours took place – but there were 32 such times, and most candidates clearly found this prospect unappealing. Although such a list may have seemed highly inefficient for tackling just a couple of the questions, the fact that it made almost all of the 15 marks available here much more accessible would have justified it. The main danger in this question lay in omitting one of the tours in the list, leading to a series of further erroneous conclusions.

- (a)** This was well answered in general – some candidates offered a list of times, although this was not necessary (and there were no partial marks available for this question, so it was not advisable tactically).
- (b)(i) and (ii)** This question involved the consideration of the cycle of tour guides, atop the schedule of caverns. It proved surprisingly easy for this to go awry, especially in identifying the timing of the return from the last tour. As mentioned above, it is recommended that candidates review what is needed for the entire question, and then consider what degree of detail to engage in, when embarking upon a question with such a serial structure (i.e. where a small error early on in the question is likely to be perpetuated thereafter).
- (c)(i)** This question extended the process initiated in **(b)** – linking up the two patterns (of tour guides and caverns). Although follow-through marks were available (ensuring that single errors early on were not fatal), success at this question was largely related to candidates' care and willingness to record

their working. Overall, 8 marks were available for reliably matching up the tour guides and the tour times, and less than 20% of candidates managed this.

- (ii) This question could be tackled independently of the previous question, and marks were available for answers which misjudged **(c)(i)**. Quite a number of candidates omitted to deduct 20% from the tours occurring after 2 pm.
- (d)(i)** This question was facilitated by a clearly-laid-out list of times – and many candidates offered an incorrect time, without working, which allowed little scope for diagnosis of the error made.
- (ii) As with **(d)(i)**, a minimal amount of working allowed candidates to gain ‘follow-through’ marks here. The question was tackled fairly well as a result.
- (e)** This question required candidates to work at a strategic level before engaging with the challenge of choosing four tours that deliver the result. Very few candidates managed to identify an appropriate ordering of the tours (with the most expensive two coming last), and find times to satisfy it.

# 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

- Candidates should ensure that they study all the details in the questions and examples very carefully, so that they have all the conditions for the problem clear in their minds in order to tackle the questions successfully.
- It is very important that candidates lay out their working in a clear and orderly fashion. Marks will often be awarded for clear evidence of good problem-solving methods, even if the final solution is not arrived at. When candidates are not confident of obtaining the full solution, they should be aware that they may gain credit for showing that they understand some aspects of the problem, if not all.

## General Comments

This paper required candidates to engage in the full range of problem-solving skills: the questions involved careful reading of the text laying out each problem's structure, some experimental investigation of the options, and considered reflection on what best fitted the question's requirements. Although 36 of the 50 marks could be won with a brief, unsupported answer, there was a great incentive for candidates to show their working: there were 20 marks available for sensible working which led to an incorrect final solution to a part of a question. 14 of the marks available required an appropriately expressed explanation, or a more detailed answer. Although some candidates clearly suffered because they misallocated their time, most attempted all four questions. Candidates' answers to **Question 3** tended to garner the most marks, and **Question 1** delivered the least, in general.

## Comments on Specific Questions

### **Question 1**

This question required candidates to predict where the shadows of the squares would be cast on the screen, using a diagram, or by applying their knowledge of vectors, or of mathematical similarity. It was essential that this logical process was correctly grasped for the candidates to have any success with the problem-solving. No example was given, but the candidates were given a diagram which showed a possible answer to the first question. Very few candidates showed a systematic method for predicting where squares on the different tracks would appear on the screen, and many gave vague, non-quantitative answers to most of the questions.

- (a) The easiest way to tackle this question was to consider the plan view of the tracks, and infer the length of one side of the square using similar triangles. Some candidates clearly attempted to use the ratio of lengths (4:2:6) and jumped to erroneous conclusions about the size of the shadow on the screen (for instance, that it would be twice the size of the original).
- (b) A successful answer to this question depended on candidates appreciating the ratio of the distances between the track and the screen (1:2) and then gauging when an object in track 1 would cast a shadow on the edge of the screen. Some candidates accomplished this by dividing the distance between the centre and the edge of the screen by 3, and concluding that the square must be  $(10.5 - 3.5 =) 7$  m from the left hand edge. The other alternatives were to sketch a plan of the relevant area, or (informally) use vectors. This question was answered correctly by only a few candidates.
- (c) A similar analysis was needed as for part (b), but directed at the position of squares in track 2. This clearly depended on confident use of the ratio of distances between the tracks. Most candidates



struggled to display the inter-relationship between the tracks in adequate detail to address this question.

- (d) This question required candidates to deduce how  $12 \text{ m}^2$  could be created using two squares, and then consider possible overlapping positions. Greater precision was required in order to confirm the position of the track 2 square, and very few candidates managed a correct solution as a result.
- (e) (i) Most candidates who attempted this question took it as an invitation to bend the rules; in particular, to consider squares of different lengths, and tracks at different distances from the screen. The relevant rules given at the beginning of the question apply throughout unless explicitly waived for a sub-question.
- (ii) The final part of the question could be attempted without reference to the vectors and ratios that the previous parts depended on. The combinations of square numbers alone would have led candidates to the conclusion that an area of 3 was the smallest that was impossible. Accompanied by basic working this was awarded 1 mark. The fact that 3 units was possible by throwing a shadow on the edge of the screen (e.g. a square which is 5 m from the left of track 2 only leaves  $\frac{3}{4}$  of its shadow on the screen) enables all the areas up to and including  $10 \text{ m}^2$  to be displayed.

## Question 2

This question required candidates to consider the overlapping averages created by the digits representing pixels, and to experiment with possible underlying data. Although it seems likely that the process of pixellization may well have been unfamiliar to many candidates, most were able to engage with its logic, and experiment with the problems considered as the question developed. The provision of an example allowed candidates to check that their interpretation of the logical rules was correct.

- (a) Completion of the instructions defining pixellization was achieved correctly by most candidates – the most common mistake being the failure to round down once the mean was calculated.
- (b) The reversal of the pixellization process, and the necessary speculation involved, required candidates to develop a basic understanding of how the combinations were restricted by the total: those who merely guessed a value and checked it was possible, but not that it was optimal, tended not reach a correct answer.
- (c) The overlapping restrictions created by moving pixellization offered candidates a wealth of possible approaches – most commonly ‘trial and improvement’, followed by an algebraic approach. A number of candidates managed to express the inequalities algebraically, but then struggled to solve them – which gained partial marks.
- (d) About half the candidates offered a numerical list (as was intended) in answer to the question; the remainder gave descriptive responses or none at all. Although some candidates offered solutions which involved pixels other than 0 and 15, most engaged appropriately with the evolving logic of the question, appreciating that 3\_3\_3\_3 must reflect only one ‘15’ in the first four pixels. Some candidates gave answers with more or less than 12 numbers, which were difficult to assess – candidates are advised to scrutinise their answers for potential ambiguity wherever possible.
- (e) (i) This question required candidates to experiment with binary patterns, in search of one fitting the requirements. There was a great variety of suggested solutions, and a number of candidates managed to find a pair of appropriately asymmetrical 4-letter sequences (the simplest being 15\_0\_0\_0 and 0\_0\_0\_15).
- (ii) A small number of candidates managed to look beyond the 8-letter sequences, and find a 6-letter sequence which fitted the requirements (such as 15\_0\_15\_0\_0\_15).

## Question 3

This question required candidates to consider a pair of inversely related rates (speed and fuel consumption) and the inter-relationship between them. This was reduced to a ‘discrete’ problem by means of the three road types, and regular distances in between junctions. Success at the question depended on careful calculation of the different variables (distance, speed, time, fuel), and methodical trial and improvement. Many candidates were able to show their working efficiently and unambiguously – which ensured that the

minor numerical errors which often beset candidates' responses to such problems did not harm their scores too much.

- (a) Although there was no worked example to show how the fuel consumption was calculated, this first question enabled candidates to confirm that they were combining the quantities correctly. Most candidates were able to articulate the middle stage of the working (that the car consumed 3 litres every 10 km on the highway), and were awarded the mark. A large number of candidates did this without using words, which was credited as long as the calculations were unambiguous – it is recommended that candidates define the constituent parts of any calculation where they are asked to demonstrate a given answer.
- (b) This question involved a direct following of instructions (take the total distance, remove 20 for highway, divide into thirds, ...) and was completed competently by more than half the candidates. Those who left clear working showing the lengths of the different sections of road were awarded partial marks even if their calculations went awry. The most common error was to divide the 180km between country roads and minor roads, assuming that the 20 km of highway was all that was required – an interpretation that was explicitly discounted in the question.
- (c) This question was the first to abide by the inequality restricting the distances on each of the three roads ( $C > M > H$ ) – and some candidates applied these in the wrong order, or assumed that the inequalities were not strict (i.e.  $C \geq M \geq H$ ). However, the majority of candidates did offer a solution which abided by the restrictions. The choice of optimal solution – maximising the distance on minor roads, and minimising the distance on the highway – was identified by some. Many achieved partial marks for a selection of distances which abided by the restrictions but was not optimal.
- (d) The logical priorities of this question were more demanding than (c), but most of those who submitted a valid solution to (c) also did so for (d). An optimal solution required candidates to appreciate that the maximum distance that could be spent on the highway was 50 km (because  $60 + 70 + 80 > 200$ ), and then to maximise the amount of distance on country roads. This process was clearly more taxing than (c), and far fewer candidates reached a totally correct answer.
- (e) The interaction of the two inversely related rates only became explicit in this question, in which candidates were expected to balance the need for speed and fuel efficiency. The mark scheme was more demanding for this question – requiring candidates to locate a combination which prioritised the distance spent on country roads appropriately. As such it credited those who demonstrated a good strategy as well as mere operational skills.
- (f) The final part of the investigation built on part (e), and required candidates to suggest a permutation of the three road types which would ensure that no individual section was more than 20 km. This was only really attempted by those who had completed (e) with some success – it seems likely that many candidates were put off by the new logical requirement, and left the question due to time pressures.

#### Question 4

This question required candidates to track the scores of two competitors, while filtering the scores for multiples of 3, and keeping a tally of how many digits had been used. As such the data which candidates had to process and analyse was created by themselves (as they list the scores). Many candidates were clearly tempted to list the scores mentally, and such 'efficiency' was strongly correlated with accidental error. This question was completed less successfully than in previous sessions, and this may have been due to candidates taking short-cuts in their working.

- (a) (i) This question was not completed well by the majority of candidates: the initial extraction of the data from the game's rules was not obvious, and many failed to realise that a player could have a maximum of 15 'plays' if the fourth play of any number led to the game finishing. A few candidates checked that the score of zero would not be reached first – but most candidates assumed that 90 plays were possible (i.e. each player playing 1s repeatedly), or began to consider the scores from a particular game. Very few candidates completed this question correctly.
- (ii) Many candidates fell into the trap of adding eight 2-minute intervals to the eight rounds – those who correctly spotted that only seven such intervals would occur were awarded the mark here, irrespective of what time they carried forward from (a)(i).

- (b) This question required a careful listing of the scores, for three turns each, considering the extreme scores that could be played without terminating the game – and was completed successfully by very few candidates. Very few candidates wrote down the possible scores – and it was difficult to see where candidates had made mistakes with any confidence.
- (c) The question was tackled better than (b) by most candidates, although the task was essentially the same – to consider what scores were possible from a given starting point. Although this question did not require candidates to consider what an optimal move was (unlike (b)), it was deeper into the game and therefore required consideration of which numbers had been played before. The main difference, however, was that it asked for a list – and left less to the untrustworthy machinations of ‘mental maths’.
- (d) (i) This question asked for a logical explanation of Lee’s choice – and required candidates to consider what kind of explanation was appropriate. Having stated that the only options that he considered were 1 and 4, it was expected that candidates would focus on why he chose one rather than the other. Such an explanation naturally depended on the difference between the scores he could expect from playing each number. However, there were a multitude of answers to this question (“*because he felt like it*”, “*because he couldn’t play the game properly*”) which did not engage with the strategy and scored no marks. Few candidates managed to offer an answer which referred to the points won in each case, even without the particular scores, and hence few marks were awarded.
- (ii) This question was tackled relatively well. It required candidates to consider Lee’s turns during the game, and to strike off those options which had been played three times. It seems likely that this task was completed on the Question Paper by many candidates.
- (iii) This extended the process begun in (d)(i) and (ii), and required a clear listing of the final numbers played by Lee and Ric. The relative ease of checking for multiples of 3 ensured that this was mainly a test of candidates’ ability to tally the numbers which the players had used, and ensure that no numbers were used too many times. About 10% of the candidates accomplished this correctly.
- (e) (i) This question required candidates to use the total score, given on the diagram at the beginning of the question, and subtract the scores from rounds 1, 2, 3 and 5 to deduce the score in round 4. Very few candidates assembled the appropriate pieces of information – this reflected the difficulty in selecting the previously unused information from earlier in the question, under pressure of time. Little working was shown in answers to this question, and very few candidates gained the partial marks which were allocated to an appropriate statement of the score from round 5.
- (ii) Many candidates offered a solution to this question, but most appeared to be guesswork. The facts that Ric had won round 5, and had won one more round than Lee, allowed candidates to deduce that Ric had won rounds 2 and 3. This result was difficult to secure without a correct answer to (e)(i).

# THINKING SKILLS

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**Paper 9694/41**  
**Applied Reasoning**

## Key Message

A significant proportion of candidates wrote answers whose length did not reflect the mark allocation, although there was little evidence that candidates were running out of time.

## General Comments

Candidates seemed comfortable with the two subject areas, TV viewing habits and texting, and several candidates produced good answers to **Questions 1, 3 and 4**. The standard of scripts varied widely between centres. Some Centres had clearly prepared candidates well while others seemed completely unfamiliar with the skills or language of reasoning.

## Comments on Specific Questions

### **Question 1**

In comparison to previous **Question 1s** this was well done and the majority of candidates were able to get at least two marks. Good candidates tended to score three or four but it was rare to award five marks. Almost all of the marking points were awarded occasionally, with one candidate even spotting that if the results were indeed rounded up then the combined totals should exceed 100%. Many of the weaker responses addressed what was perceived as a small sample size. In the scenario given the size of the sample was not a major weakness; the unrepresentativeness was much more of an issue and, pleasingly, most candidates spotted this. Some candidates merely offered counter-assertions – evidence that they understood the task but were not well prepared for the examination. However, very few attempted to explain the data and the inferences drawn from them – suggesting that almost all understood the question.

### **Question 2**

Candidates who had been prepared for the examination usually gained some marks for this question, although it was rare to award more than five marks. A small minority, restricted to a few Centres, 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**

The subject matter and the quality of the argument meant that most candidates were able to pick up some marks on this question, more than in past **Question 3s**. Many successfully identified contradictions, slippery slopes, extreme examples and implicit assumptions. Some strong candidates gained eight marks out of the available nine. However, none achieved the full nine marks as most answers either lacked an overall evaluative comment or the overall evaluation given was not precise enough. Candidates are advised that “this argument is weak because it contains a lot of flaws and assumptions” is not a creditworthy overall evaluation. As ever, weaker candidates simply stated a series of counter assertions to the claims made in the document.

#### Question 4

Candidates were clearly comfortable with the subject matter and many wrote competent arguments. However, the quality of response varied and there was evidence that this was centre-dependent.

Many responses merely rearranged the points made in the documents into the format of an argument. Within Centres, stronger candidates included ideas of their own or used intermediate conclusions well, which often boosted marks for quality. Some Centres had taught candidates to combine or contrast documents which gained some credit. Other Centres had taught candidates to evaluate any documents used, which often gained further credit. Still other Centres had taught candidates to address counter arguments, which often gained credit but the quality with which this was done varied a lot. Candidates from the best Centres were able to display all of these skills and the best of those candidates made reasoned inferences from the documents.

Weaker candidates simply summarised the points in the documents without presenting a clear argument. Centres are reminded that an argument needs a conclusion – and a precise and well-supported conclusion is likely to achieve more marks.

# THINKING SKILLS

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**Paper 9694/42**  
**Applied Reasoning**

## Key Message

There was little evidence of candidates running out of time on this paper. A significant proportion of candidates wrote answers whose length did not reflect the mark allocation – responses to **Question 1** should be considerably shorter than those to **Question 4**.

## General Comments

The standard of candidates was generally low and there was evidence that many were ill-prepared for the examination.

## Comments on Specific Questions

### **Question 1**

This was, on the face of it, a fairly straightforward question in which it was expected the majority of candidates would be able to gain some marks. Candidates who were aware of what was being asked, i.e. to criticise the statistics being presented or the inferences drawn from them, often achieved marks for pointing out either that some of the data presented were about men while others were about adults, or that a correlation does not imply a causal effect. However, few candidates achieved more than two marks out of five and it was rare to award any of the other marking points. Many candidates merely offered a list of counter-assertions – evidence that they understood the task but were not well prepared for the examination. Worryingly many candidates attempted to explain the data and the inferences drawn from them – suggesting they did not understand the question.

### **Question 2**

Candidates who had been prepared for the examination usually gained some marks for this question, although it was rare to award more than four marks. Again, some candidates did not understand what was required of the task and attempted to paraphrase, summarise or criticise the argument. Successful candidates identified parts of the text, copied them out and labelled them as MC, IC etc.

### **Question 3**

The argument was quite a challenging one to evaluate and the question was very poorly done, even by candidates who had been taught well. The majority of candidates simply stated a series of counter assertions to the claims made in the document. Some candidates knew what 'evaluate' meant and were able to identify some problems, more often than not one of the contradictions, but they were in the minority.

### **Question 4**

The subject matter for the argument was quite difficult for many candidates and few scored above half marks. Candidates who did better precisely stated a conclusion and were selective about using reasons from the documents to support that conclusion.

Disappointingly few candidates used ideas of their own and fewer still made critical comments about the documents. As the subject matter was difficult, many candidates argued about the relative merits of religion and science as opposed to the extent to which religious convictions should enter into discussions about scientific claims. These candidates were however able to gain credit for proficiency in other skill areas such as argument structure and critical use of documents. While it was pleasing to see the majority of candidates

offer some sort of conclusion, a disappointing number are still writing “I agree” or “I disagree”. Centres are reminded that an argument needs a conclusion – and a precise and well-supported conclusion is likely to achieve more marks.

# THINKING SKILLS

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Paper 9694/43  
Applied Reasoning

## Key Message

A significant proportion of candidates wrote answers whose length did not reflect the mark allocation, although there was little evidence that candidates were running out of time.

## General Comments

Candidates seemed comfortable with the two subject areas, TV viewing habits and texting, and several candidates produced good answers to **Questions 1, 3 and 4**. The standard of scripts varied widely between centres. Some Centres had clearly prepared candidates well while others seemed completely unfamiliar with the skills or language of reasoning.

## Comments on Specific Questions

### **Question 1**

In comparison to previous **Question 1s** this was well done and the majority of candidates were able to get at least two marks. Good candidates tended to score three or four but it was rare to award five marks. Almost all of the marking points were awarded occasionally, with one candidate even spotting that if the results were indeed rounded up then the combined totals should exceed 100%. Many of the weaker responses addressed what was perceived as a small sample size. In the scenario given the size of the sample was not a major weakness; the unrepresentativeness was much more of an issue and, pleasingly, most candidates spotted this. Some candidates merely offered counter-assertions – evidence that they understood the task but were not well prepared for the examination. However, very few attempted to explain the data and the inferences drawn from them – suggesting that almost all understood the question.

### **Question 2**

Candidates who had been prepared for the examination usually gained some marks for this question, although it was rare to award more than five marks. A small minority, restricted to a few Centres, 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**

The subject matter and the quality of the argument meant that most candidates were able to pick up some marks on this question, more than in past **Question 3s**. Many successfully identified contradictions, slippery slopes, extreme examples and implicit assumptions. Some strong candidates gained eight marks out of the available nine. However, none achieved the full nine marks as most answers either lacked an overall evaluative comment or the overall evaluation given was not precise enough. Candidates are advised that “this argument is weak because it contains a lot of flaws and assumptions” is not a creditworthy overall evaluation. As ever, weaker candidates simply stated a series of counter assertions to the claims made in the document.

### **Question 4**

Candidates were clearly comfortable with the subject matter and many wrote competent arguments. However, the quality of response varied and there was evidence that this was centre-dependent.



Many responses merely rearranged the points made in the documents into the format of an argument. Within Centres, stronger candidates included ideas of their own or used intermediate conclusions well, which often boosted marks for quality. Some Centres had taught candidates to combine or contrast documents which gained some credit. Other Centres had taught candidates to evaluate any documents used, which often gained further credit. Still other Centres had taught candidates to address counter arguments, which often gained credit but the quality with which this was done varied a lot. Candidates from the best Centres were able to display all of these skills and the best of those candidates made reasoned inferences from the documents.

Weaker candidates simply summarised the points in the documents without presenting a clear argument. Centres are reminded that an argument needs a conclusion – and a precise and well-supported conclusion is likely to achieve more marks.