

THINKING SKILLS

<p>Paper 9694/11 Problem Solving</p>
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Key messages

Candidates should be encouraged to show their working and not just write down answers. Most questions are worth more than a single mark, and partial credit is available for intermediate steps in the working, even though the final answer may be incorrect.

Tidy presentation of work will not only help the candidate to work accurately but will also help the Examiner to follow the thought process of the candidate with a view to being able to award partial credit.

Candidates are provided with answer lines after each part question and they should write their solutions, and not just their final answer on these lines. Many candidates seemed to think that they needed to squeeze their working outside of these lines and around the edge of the page. This makes it difficult for the Examiner to follow what is happening.

When an explanation is asked for in a question where numbers are involved, as is common on Paper 1, it is almost always the case that candidates should use these numbers in their explanation.

General comments

In general, the responses of the candidates were very variable in quality. There were some very good scripts showing a pleasing proficiency in problem solving. Other candidates attempted almost every question but their efforts were marred by misunderstanding or misinterpretation of the given information. Candidates are advised to read the questions carefully and take note of each piece of information.

Comments on specific questions

Question 1

- (a) Most candidates were able to calculate the combined cost of location hire and travelling costs for the three locations. However many candidates misinterpreted which of the total costs met the wording of the request in the question. The location chosen required the furthest distance travelled by any one of the four managers to be as small as possible. For the three hotels, this smallest distance is 14 km, 10 km and 12 km respectively, and so the location must be the Grand Hotel. Many candidates instead gave the Central Hotel, perhaps because the smallest distance travelled by any manager is 4 km to the Central Hotel.
- (b) Most candidates identified the location with the smallest total cost as the Central Hotel and gave the correct answer of \$54.

Question 2

- (a) Just over half of the candidates gave the correct answer, Tuesday. The next most common answer was Monday, due to candidates interpreting the insignificant decrease from Monday to Tuesday as significant. All other days of the week were seen, including Sunday.
- (b) Only a minority of candidates gave the correct answer, two, with the most popular answers being three or a list of the days, Tuesday, Wednesday, Thursday.

Question 3

Most candidates scored most of the marks in this question.

- (a) There was no problem in calculating the total income from membership fees, but a few errors occurred in considering the total prize money. Some candidates missed the fact that the prize draw took place each month and so subtracted \$60 instead of \$720 to find the amount donated to charity. Other candidates added the \$720 to the membership fees.
- (b) Again, there were many correct answers to this part. In some cases, the errors of **part (a)** were replicated. An additional error crept in for those who did not read the question carefully and note that the prize money was doubled in the New Year draw.

Question 4

Most candidates were able to find the total refund as \$140, but only about half continued through to the correct answer (\$7) by dividing by 10 and then looking at the factors of 14. Many of the remaining candidates divided \$140 by 50, presumably coming from 5 days and 10 weeks to give the answer \$2.80.

Question 5

This question was answered correctly by only a minority of candidates.

- (a) The essence of this part was to realise which mouse movements were necessary to produce the PIN 3296, that is, move 'one to the left', then 'one to the right and two down' and finally 'one up'. A similar pattern of movements is produced only twice, by tracing the PINs 2185 and 5408.

Some candidates gave the correct digits but in the wrong order. A significant number of candidates covered the page with all possible permutations of the digits 3296. Other candidates gave PINs for which no logical explanation was clear.

- (b) Very few candidates realised that they needed a PIN with mouse movements which gave four possible options, in other words, a square pattern. A surprising number of candidates who had not answered **part (a)** correctly gave 2185 or 5408 as their answer in this part, unfortunately to no avail. Other candidates seemed to just guess a four-digit number, and presumably hope for the best.

Question 6

The first step in solving this problem is to find the cost of the postage for a letter weighing 117 grams. The cost is \$0.65 for the first 50 grams plus $7 \times \$0.04$ for the remaining 67 grams (rounded up to 70 grams) giving \$0.93. Many candidates misunderstood this information and calculated the cost as $2 \times \$0.65 + 2 \times \0.04 giving \$1.38.

Of those candidates who found the correct cost, many then found a 9-stamp combination which achieved this total, without any apparent attempt to check if this was the minimum number of stamps that was possible. In fact, \$0.93 can be made from just 7 stamps.

Question 7

Attempts at this question were variable. The main source of errors was in not realising that when, for example, the display showed 028, then 27 appointments had been completed and the 28th was either about to begin or in progress.

- (a) The common error in this part was to assume that 28 appointments had been completed, so 140 minutes had elapsed, leading to an answer of 11:20.
- (b) This part of the question attracted more correct answers than the other parts.

- (c) There were very few correct answers to this part. Candidates did not appreciate the impact of the difference in the terminology: the smallest number of minutes and the largest number of minutes. As a result, most candidates gave 75 minutes as the answer to **part (c)** instead of 70 minutes but then the same incorrect thinking led them to the correct answer to **part (ii)**.

Question 8

- (a) Only a minority of candidates made any progress with this part. Some candidates were able to deduce that the total number of points scored in games 4 and 5 is 38. At this point, however, these candidates often decided that the two scores must each be 19. Very few candidates were able to connect their deduction of the total 38 to the information given by the fact that the RPR was 34.5 at the end of the fifth game.
- (b) About 20 per cent of the candidates made progress in this part, including some who had not got beyond obtaining the total 38 in **part (a)**. This total was sufficient to proceed in this part.

Question 9

Candidates fared less well with this question than might be expected. There seemed to be some difficulties in understanding the timetables. Some candidates appeared to treat the two sets of departure times in any one of the three tables as though they were departure and arrival times. However, many more difficulties seemed to arise from a lack of understanding of what was being asked.

- (a) Half of the candidates gave the correct answer 4. The remaining candidates gave 1, 2, 3, 5 or 6 as their answer.
- (b) Only a minority of candidates gave the correct answer of 32 minutes. A very common wrong answer was 2 hours 15 minutes. This comes from finding the difference between departures (and therefore arrivals) from Benbow or Livesey.
- (c) It was clear in this part that many candidates did not understand what was being asked. The common answer was 4 hours 19 minutes. The first available ferry from Smollett to Livesey is the 11:45 which arrives at 12:57. The first ferry from Benbow to Livesey is the 07:45 which arrives in Livesey at 08:38. The difference between 12:57 and 08:38 is 4 hours 19 minutes. However, no consideration has been given to the first part of the journey from Smollett to Benbow.
- (d) Only the stronger candidates made any progress in this part.

Question 10

The majority of candidates were able to work with the given information to deduce that 95 rubies were collected. About 30 per cent of candidates then went on to solve the problem correctly. The most common approach was to use trial and improvement. Those candidates who were able to deduce that the number of diamonds plus the number of emeralds was equal to 149 were usually successful. The key features of the given information are that the 7 points for an emerald and the 3 points for a sapphire add to 10 points and that the number of emeralds is equal to the number of sapphires.

Often the whole page was filled with trials with no apparent logic to the thinking of the candidate. A more organised approach to trial and improvement (a search method) is recommended.

Question 11

- (a) About 40 per cent of the candidates gave the correct answer to this part.
- (b) This proved to be a challenging request and the correct answer was rarely seen. A few candidates obtained the answer \$900 and gained one mark.
- (c) Correct answers to this part were very rare indeed. Many candidates either guessed an answer or omitted to answer at all.

Question 12

Both parts of this question were found to be very challenging and correct answers were a very rare sighting. Some candidates wrote something, usually a diagram stating the speeds of the two swimmers, but then did not seem to visualise what was happening. Often mathematical formulae involving distance, speed and time were written down. A more fruitful technique would have been to consider small increments of movement of the two swimmers. This might have given the candidate some insight into what was happening and therefore into solving the problem.

Question 13

This question proved to be the most challenging on the paper; very few correct answers were seen. The most common answer was 5.6 (km/h), this being the number which when averaged with 4 gives 4.8.

THINKING SKILLS

<p>Paper 9694/12 Problem Solving</p>
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Key messages

Candidates should be encouraged to show their working and not just write down answers. Most questions are worth more than a single mark, and partial credit is available for intermediate steps in the working, even though the final answer may be incorrect.

Tidy presentation of work will not only help the candidate to work accurately but will also help the examiner to follow the thought process of the candidate with a view to being able to award partial credit.

When an explanation is asked for in a question where numbers are involved, as is common on Paper 1, it is almost always the case that candidates should use these numbers in their explanation.

General comments

In general candidates engaged very well with the paper. It is acknowledged that circumstances may have made preparation more difficult. Many candidates attempted most of the questions and there were many answers of a pleasingly good standard. Most of the candidates were able to engage with at least some of the questions in a meaningful way.

Comments on specific questions

Question 1

- (a) Many candidates found this a straightforward question, either just writing down the correct answer or else working out the distances for two or more routes and choosing the shortest. Other candidates did not seem to understand how the table worked, some adding up as many as 6 values from the table to produce a totally wrong answer.
- (b) Responses here were similar to those of **part (a)**.

Question 2

Many candidates realised that the two closest guesses were 298 and 334, and so there were 316 pebbles in the box. Some other candidates realised that the two guesses had to differ by 36, but wrongly used 236 and 272 or 247 and 283, which are not adjacent guesses, and so do not lead to the solution. A small number of candidates added all the guesses together and found the mean.

Question 3

- (a) The majority of candidates gave the correct 3 pairs of courses. A small number of candidates omitted one or two of these, and a few included other wrong pairs of courses.
- (b) Quite a number of candidates spoiled a correct answer of 'French on Mondays' by adding extra wrong combinations of courses or days or both. A small number gained only partial credit for stating 'French' without specifying the day, or with the wrong day specified.
- (c) Fewer candidates did this part correctly, though some others did realise that George and Hetty could now take Mandarin, without specifying that they could take it on Fridays.

Question 4

- (a) Most candidates correctly divided 1000 kg by 125 g, though a small number had problems with the units and ended up with wrong answers like 8, 80 or 800. Some candidates divided by the wrong weight, usually 160 g but sometimes 180 g.
- (b) Most candidates correctly worked out that the minimum weight of oil in one tin is 5 g, and some left this as the answer. Candidates also had to realise that they needed to use 160 g in working out the number of tins produced in a day; some used the number of tins found in **part (a)**.

Question 5

- (a) July was just about the most popular answer, but only a small minority of candidates gave it. All the other possible answers were seen.
- (b) Only a very small minority of candidates did this part correctly, with most candidates appearing to guess three months at random. A small number of candidates gained partial credit by realising that February and March must start on the same day, but then gave an incorrect third month.

Question 6

- (a) Most candidates realised that the greatest number of appointments would occur if they were all for 5 minutes and arrived at the correct answer of 90. A small number of candidates were not able to work out correctly that the doctor had appointments for 7 hours 30 minutes each day or that there were twelve appointments per hour.
- (b) Candidates could tackle this either by realising that the doctor would be able to have 45 appointments by lunchtime, leaving 15 for the afternoon session, or by realising that the doctor now has 30 fewer appointments, so can finish 2 hours 30 minutes earlier. Candidates then had to realise that the question asked for the time the doctor had his final appointment for the day – and that this could be before he had his afternoon tea break. Quite a number of candidates gave the correct final answer of 15:15, but rather more gave the answer 15:30 – having thought the doctor had his afternoon tea break before seeing his last patient.
- (c) Only a small number of candidates realised that, in order to end his final appointment at 16:30, the doctor would have had appointments for either 360 minutes or 375 minutes. Very few candidates then gave the two possible combinations of 5– and 10-minute appointments, though some candidates gave one possible combination.

Question 7

The majority of candidates were able to do this question correctly. Some realised that, with 6 times as many \$1 notes as \$5 notes, the situation could be represented by the equation $5x + 6x + 10y = 200$, and that the only whole number solution was nine \$10 notes. Other candidates used a less formal version of this approach. The main errors in this approach were to write the equation as $x + 6x + 10y = 200$, or the answer as ninety \$10 notes.

Question 8

- (a) (i) Candidates found this part difficult, with only a small number giving the correct answer, and many omitting this part.
- (ii) This part was done a little less well than **part (i)**.
- (b) There were very few correct answers to this part, with many candidates omitting it.

Question 9

- (a) This part was usually answered correctly. The most common wrong answer was \$360, given by candidates who thought there was a 10 per cent discount on all 4 nights.
- (b) This part was answered correctly by a minority of candidates. Partial credit was awarded to those who applied the 15 per cent discount to Monday – Friday, or to Sunday – Thursday, and to those

who used the 3 night 10 per cent discount twice. No credit was given to those who applied a 10 per cent or 15 per cent discount to all 7 nights.

- (c) Only a few completely correct answers to this part were seen. Partial credit was given for correctly dealing with the 6 nights from the middle Sunday to Friday, including the 15 per cent discount for the first 5 of those nights, and also for correctly applying the 10 per cent discount to the final 3 nights from Sunday night to Tuesday night.

Question 10

Many candidates found this question too difficult, either omitting it or guessing an answer. Some candidates were successful by first working out that the order of boats is A-P-C-T-L-S (or the reverse) and then explaining that, since Alex's swap on Tuesday was to a better – but not the best – crew, Aquarius has to be the worst, and therefore Sagittarius the best, crew. Other candidates started by reasoning that the best crew must be either Aquarius or Sagittarius because they are each involved in only one swap. Some candidates gave only the answer Sagittarius but did not receive full credit because of a lack of reasoning.

Question 11

- (a) Almost all candidates showed that the price for both offers is the same by showing how each offer results in the customer paying \$13 for 15 envelopes. A small number of candidates ended up with a different total for one or both offers.
- (b) This was more challenging than **part (a)**. A minority of candidates gained partial credit for stating that 6, 7, 8 and 9 were the possible numbers of envelopes Colin might have bought. Only a very small minority also included 18 and 19 – and nothing else – in their answer.

Question 12

- (a) This part was done well, with most candidates identifying Camel Lane as the stop omitted. Some candidates gave the wrong number of minutes of reading, with 11 being quite common.
- (b) About half the candidates gained some credit on this part, though many of those gave the wrong number of minutes of reading.
- (c) This part was found difficult. Many candidates who were correct did their working mentally without showing any written working. Others used trial and improvement – though rarely fully correctly. One method seen involved showing that the reading time if the bus left at 10.35, for example, is 20 minutes; this is 7 minutes more reading time than required so the bus must have left 7 minutes later, at 10:42.

Question 13

Very few candidates made any progress with this question, with many omitting it. The most common attempts either just repeated the information given in the question or worked out the times taken for one lap by each of Ali, Kim and Viv – 150 s, 240 s and 171.4... s. To be successful candidates needed to work out the times when pairs of runners passed each other again, and then find the lowest common multiple of two (or all three) of those times. A very small number of candidates misunderstood the question and worked out when the three were together again at the point on the circuit where they were initially side by side.

THINKING SKILLS

<p>Paper 9694/13 Problem Solving</p>
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THINKING SKILLS

Paper 9694/21
Critical Thinking

Key messages

Although this exam to some extent tests generic skills, which are developed as by-products of the study of other subjects, it is impossible to perform well without studying the specification, preferably with the aid of the endorsed textbook and with reference to previous question papers and mark schemes. In particular, it is necessary to know such items as reliability criteria, the meaning of the expressions ‘argument’, ‘argument element’ and ‘analogy’ and the names of certain flaws and weaknesses in reasoning.

General comments

Most candidates attempted the whole exam, but a few omitted many parts, while others omitted one or two parts, especially of **Question 4**.

In various places in the exam, some candidates referred to ethos, logos and pathos. These terms from the discipline of rhetoric are not part of the Thinking Skills specification and are therefore never the right answer to a question in this exam.

Comments on specific questions

Section A

Topics for **Section A** may be drawn from any academic discipline. On this occasion, the subject areas were psychology and physiology.

Question 1

- (a) Many candidates achieved 1 mark for pointing out that Source B illustrates the two types of smile described in Source A; however, some answers were too vague to be credited. A significant minority of candidates made the second point on the mark scheme, namely that the pictures are unable to support the claim in Source A that one type of smile is genuine and the other ‘fake’.
- (b) (i) This question potentially gave an opportunity for candidates who did not know the list of reliability criteria to apply one of them to a source. The key words from the source were, ‘A moment’s thought about our own experience will reveal...’. A minority of candidates gave one or other of the two reasons why the source did not rely on the author’s expertise, while a very few achieved 2 marks out of 2 by identifying both of those reasons. However, most candidates judged wrongly that the source relied heavily on the expertise of the author, because all published articles rely on expertise, because there would be no reason to accept the author’s claims if he did not have expertise or because the author had expertise about his own behaviour. Some candidates were misled by thinking that ordinary human experience, of the kind implied in this source, qualified as expertise. Candidates should not allow their study of reliability criteria to obscure the fact that many documents and arguments rely on their inherent plausibility and persuasiveness rather than the reliability of their source. Some candidates referred to the expertise of ‘several biologists and psychologists’ instead of the author.
- (ii) Although this question explicitly instructed that answers should be based on reliability criteria, most did not mention them and were therefore not credited. Popular wrong answers were that the source was reliable because it was a research report and because it included statistics and that the sample size was either too small or large enough to justify reliable conclusions. Because only 1

mark was allocated to each answer, detailed justifications for judgements made were not required, but merely naming a reliability criterion without any explanation of how it applied to the situation was insufficient to be awarded a mark.

- (c) Several correct and significant answers were available, and many candidates correctly identified and explained one or two of them. The most popular correct answer was a combination of two points from the mark scheme, namely that someone's smile in a single photograph is not sufficient evidence of how happy they were throughout their life. The most significant answer, and a crucial weakness in the research, was that the conclusion relied on interpreting smiles as proof of happiness, but failed to provide any evidence or reasoning as to why this was true. Popular wrong answers were that the researchers should not have limited their data to the players who had already died, that the sample size was too small to be the basis for reliable conclusions, that the researchers ignored possible causes of death other than unhappiness and that the researchers confused correlation with causation.
- (d) Although a significant number of candidates judged correctly that Source E was an argument, a similar number judged that it was not. Many of those who made the correct judgement did not use the word 'conclusion', and most of them were considered too far away from the correct answer as stated in the mark scheme. Several candidates wrongly differentiated between 'claim' and 'conclusion', and identified them both separately. As shown on the mark scheme, there is a standard format for the correct answer to questions of this type when the answer is 'yes', and candidates should be prepared to use it. Some candidates whose answers were in the right format lost a mark by misidentifying the conclusion of the argument. Many of those who judged that Source E was not an argument said it was because it was a 'tip' or because it lacked a conclusion. Other wrong answers were unrelated to the specialised meaning of the word 'argument' used in Critical Thinking, particularly alleging that the source was not an argument because it did not include a counterclaim or rebuttal or was not opposing a different side.
- (e) Most candidates spotted the first point on the mark scheme, but many were awarded only 1 mark because they did not make the reference to genuineness explicit. Some candidates were awarded 0 marks for describing or summarising Sources A and E, or for identifying a difference between them (e.g. of genre, purpose or credibility) which did not constitute an inconsistency.

Question 2

Most candidates chose to support the claim. As on previous occasions, many did no more than simply relate some or all of the sources to the claim, thereby achieving 2 or 3 marks out of 8. A few candidates did even less than this, summarising the sources without relating them to the claim, which does not qualify as 'using' them. The key to achieving higher marks was to evaluate sources and draw pertinent inferences from them. Although the main focus of this question is on the use of the sources, 2 marks are available to candidates who include some independent thinking in their answers, and on this occasion several candidates made good use of their own experience of smiling and observing the smiles of other people. However, some candidates relied entirely on their own thinking, making no use of the sources, which severely limited the mark they could achieve. Part of the intention of the exam is that candidates should use their answers to **Question 1** when answering **Question 2**, but many candidates who showed appropriate scepticism towards Source D in **Questions 1(b)(ii)** and **1(c)** accepted its claims without reservation in **Question 2**. Most candidates conflated the genuine/fake distinction from Source A with the happy/polite distinction in Source C, although that was not what the author of the latter intended. Many candidates summarised Source E without successfully using it in support of their judgement and their reference was therefore not credited. Some candidates perceptively identified different dimensions to the difference between genuine and fake smiles.

Section B

The content and questions have been removed.

THINKING SKILLS

Paper 9694/22
Critical Thinking

Key messages

- A number of questions in this new specification and exam specifically target technical aspects of critical thinking, e.g. those that ask candidates to identify an appeal. Thorough understanding and preparation are vital if these questions are to be tackled successfully.
- A small minority of candidates made the fatal error of not allowing enough time to complete **Question 5**. Given there are now 8 marks maximum awarded for this question, not attempting this question means candidates are depriving themselves of a significant percentage of the total marks for this paper.

General comments

There was a noticeable divide between candidates who were well-prepared for the paper (a majority) and those who did not seem to understand what the questions required.

Comments on specific questions

Section A

Question 1

- (a) (i) Most candidates gained at least one mark on this question by using the credibility criteria of vested interest or bias for suggesting unreliability, and expertise for suggesting reliability. Some candidates implied rather than explicitly referred to the criteria – it is preferable that the criteria are explicitly used in answering this type of question.
- (ii) Most candidates gained the mark here by pointing out the lack of specific solutions. Many did this by saying no examples were given of solutions.
- (b) This question was answered correctly by only a minority of more able candidates, who correctly saw that these accidents were not relevant to the issue of the danger posed by nuclear waste disposal as opposed to more general issues of nuclear safety.
- (c) Most candidates gained at least one mark here though only a minority scored three marks. Marks were lost if vague and/or over-speculative answers were given, or if one of the answers was a version of a previously made point.
- (d) Some candidates missed the point here by talking about nuclear fission when the quote is referring to nuclear fusion. Many candidates focused correctly on the key point that Source A suggested that scientists were unable to extract more energy from nuclear fusion than they used in creating it, but were less successful in explicitly making the point that this suggested there were issues of science that needed to be resolved – at the moment fusion is unviable as well as expensive.
- (e) A large number of candidates did correctly say this was an argument but then gave an explanation that suggested they did not understand what an argument was, as defined in the specification, so they could not get any marks. Putting both sides of the issue seemed to be one popular but incorrect definition. Candidates who did correctly define an argument as having a conclusion supported by reasons usually managed to secure two marks by identifying the specific conclusion in the passage – generic answers were somewhat rarer than usual.

Question 2

Candidates answered this question quite successfully on the whole with a reasonably even split between agreeing and disagreeing with the statement. A number of candidates also went beyond mere use of the sources and made inferences from the source information supplemented with their own thinking. Evaluation of the sources was less common or, if attempted, less successful.

Section B

Question 3

- (a) A good proportion of the candidates correctly identified the main conclusion.
- (b) Most candidates identified at least one of the intermediate conclusions, even if they had wrongly identified the main conclusion.
- (c) The vast majority of candidates correctly answered this with many getting 2 marks. This is probably because the expression 'example' is widely used and understood in general usage, in contrast to expressions like 'argument element' or 'appeal' (see below).
- (d) Candidates struggled to correctly identify assumptions here, with very few gaining 4 marks. A surprising number challenged statements that were explicitly made in the paragraph, which is not the correct approach to identifying assumptions as defined in the specification. Many cited the possibility that people did not have or could not afford video conferencing technology, but an argument about technology making travel redundant does not have to make any assumptions about availability or affordability of this technology.

Question 4

- (a) This question was answered surprisingly badly, with even otherwise reasonably prepared candidates not seeming to understand what an appeal is. Those who did correctly identify an appeal did not succeed in evaluating it in terms of relevance and proportionality but instead offered an explanation of how the appeal worked.
- (b) In contrast to the above, most candidates were able to identify the *ad hominem* correctly but very few managed to make a creditable point about its impact on the strength of the reasoning. Most candidates simply explained why *ad hominem* was a flaw. Evaluation was difficult. Some candidates did make the point that describing these projects as 'vanity projects' was inconsistent with describing them as 'necessary'. No candidates made the point in the mark scheme that, because any counter-arguments the politicians are making are unknown, the *ad hominem* is not a flawed response to a powerful counter-argument therefore the reasoning is not weakened significantly.
- (c) This question was not done well, mainly because candidates challenged statements rather than evaluating the reasoning, e.g. time is not wasted when travelling, you can always think about things. A minority of candidates saw that the counter-argument to the idea that one can always work on a plane or train was extremely weak, simply pointing out a mode of travel where one could not work. An effective counter-argument would have shown why one cannot work on a plane or train.

Question 5

Candidates did present arguments, on the whole, and avoided a more essay-like structure, which was common in answers to the equivalent question in the previous specification. However, a significant number of candidates are still presenting arguments for *and* against the claim, which is not what is required. Any points against the argument they are making need to be countered and this will then be credited. Most candidates avoided using material in the passage but some did explicitly challenge points made in it which could not be credited. Most candidates seemed to think it was a good idea to go out to work. Some candidates argued against people being *forced* to go to their workplace but this was not the specific proposition being offered here.

THINKING SKILLS

Paper 9694/23
Critical Thinking

Key messages

- A number of questions in this new specification and exam specifically target technical aspects of critical thinking, e.g. those that ask candidates to identify an appeal. Thorough understanding and preparation are vital if these questions are to be tackled successfully.
- A small minority of candidates made the fatal error of not allowing enough time to complete **Question 5**. Given there are now 8 marks maximum awarded for this question, not attempting this question means candidates are depriving themselves of a significant percentage of the total marks for this paper.

General comments

There was a noticeable divide between candidates who were well-prepared for the paper (a majority) and those who did not seem to understand what the questions required.

Comments on specific questions

Section A

Question 1

- (a) (i) Most candidates gained at least one mark on this question by using the credibility criteria of vested interest or bias for suggesting unreliability, and expertise for suggesting reliability. Some candidates implied rather than explicitly referred to the criteria – it is preferable that the criteria are explicitly used in answering this type of question.
- (ii) Most candidates gained the mark here by pointing out the lack of specific solutions. Many did this by saying no examples were given of solutions.
- (b) This question was answered correctly by only a minority of more able candidates, who correctly saw that these accidents were not relevant to the issue of the danger posed by nuclear waste disposal as opposed to more general issues of nuclear safety.
- (c) Most candidates gained at least one mark here though only a minority scored three marks. Marks were lost if vague and/or over-speculative answers were given, or if one of the answers was a version of a previously made point.
- (d) Some candidates missed the point here by talking about nuclear fission when the quote is referring to nuclear fusion. Many candidates focused correctly on the key point that Source A suggested that scientists were unable to extract more energy from nuclear fusion than they used in creating it, but were less successful in explicitly making the point that this suggested there were issues of science that needed to be resolved – at the moment fusion is unviable as well as expensive.
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THINKING SKILLS

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

Candidates should be encouraged to show their working, including a brief indication of what any significant numbers are, and not just write down final answers. Working should be done on the answer booklet and not on the question paper, and working should not be crossed out unless it has been rejected and replaced by another attempt.

Paper 3 covers analysis and solution: in all parts of questions worth more than a single mark, partial marks are available for intermediate steps in the working, even if the final answer is not fully correct.

General comments

Most candidates attempted all of the questions and there were many clear and fully correct answers. Most of the candidates were able to do at least part of each question.

Time could be saved and errors reduced by many candidates by using more efficient methods for calculation. With or without calculators, many candidates laboriously calculate something like $(1076 + 23115) - (1074 + 23113)$ rather than seeing it as $(1076 - 1074) + (23115 - 23113)$ and thus $2 + 2$.

Responses to 'Show that' questions should have answers containing at least a brief description, such as those given in the mark scheme.

Numbers in questions are often chosen to make the calculations easier, so runners may seem slightly slow or cyclists fast, but answers can generally be checked with common sense. However, candidates should not assume that the dollars are US dollars.

It is not necessary to write out the question on the answer paper; those that did so often ran out of time. Candidates should ensure that the response matches the question and part. There was no **5(d)**, and responses to **4(e)(ii)** written after **4(c)(i)** need to be very clear with the handwriting.

Comments on specific questions

Question 1

- (a) Almost all candidates correctly took the total of the maximum in each case, the total of the minimum in each case, and then took the difference of the totals (as shown in the mark scheme), rather than the slightly simpler process of just adding the differences. For this part, which calls for 'show that...', candidates should identify the most and the least in words, and then observe that the difference is the given answer.
- (b) Most candidates found one or two of the combinations of dollars, but not all three. A few wrote out all or many of the possibilities at length, using up time and not always doing it in a systematic way. Some added the options instead of multiplying them, getting $2 + 3$ ways instead of 2×3 .
- (c) Some candidates chose one offer and then gave a response just for that case, rather than trying all and selecting the best.
- (d) Most candidates found the cheapest options, but not so many found the most expensive.

- (e) The important detail here was that it was possible to use ‘special offers’ for some but not all of the diners. Very few candidates noted that it was sometimes cheaper not to use an offer.

Question 2

The detail that there were steps at 2 m intervals was often overlooked in many parts of this question. Some candidates also overlooked the specific use of *recorded* time.

- (a) Some candidates found two of the numbers of points and then subtracted what they had from the given total and offered that as the third. For full marks, the derivation of all the items in the sum needed to be given.
- (b) Full marks for this question required attention to the detail: 2 m intervals, recorded distances to 0.1 m precision, and points going down as time went up to 500 s. Some candidates only offered one distance, usually the minimum, when two were needed.
- (c) Some candidates did not notice the need to have exactly 10 items. Others appeared to have added their own constraints to those in the question, typically that there must be at least one of each type, or only two types.
- (d) Most candidates correctly added 350 and 34, although there were some subtractions. Candidates who gave answers greater than 10 cannot have checked that their response made sense in a context where there were only 10 available. Some candidates who correctly did all the calculations did not see that ‘might have needed to answer correctly’ was looking for the end of a range, and a few took the wrong end of the range.
- (e) Many candidates correctly calculated the new points for Van and the minimum for Matt, but few appreciated that there was not sufficient information to determine Matt’s new total and wrote that Van *would* win rather than *could* win.

Question 3

The question stated that all earnings are a whole number of dollars; those who ignored this, or who tried to apply it to figures other than earnings, faced a harder question without always obtaining the required answers. Few candidates sketched a graph; it was not required, but would have helped many to see what was happening in the later parts.

- (a) Almost all candidates either found the relevant take-home pay or used the change in tax paid. A few appeared more familiar with monthly pay and duly converted back and forth with inevitable scope for rounding or other arithmetical errors.
- (b) Many correctly responded with over \$45 000 or (at least) \$45 001, but some wanted the take-home pay to be a whole number of dollars and a wide variety of responses was seen: \$45 000.02, 45 005\$, 45 000.1 etc.
- (c) Most candidates identified \$10 001 as the lower limit, but there was a wide variety of responses for the maximum, often not whole numbers.
- (d) Few candidates attempted this part. Many of those who did note that the take-home pay must be \$36 000 did not then divide by 5/6 to get her earnings.
- (e) Few candidates found either the \$152 increase up to \$9500 or the increase from \$36 000. Some ignored the ‘exactly’ and gave something which rounded to \$152.

Question 4

Any games in questions may have features that look familiar to some candidates but will probably not match any known game, so it is essential to keep to the description given. Many candidates imagined that each player had a secret stock of three tiles, when there was only one shared set with the numbers visible to both.

- (a) Only a third of candidates noted that there were 5 ways for a player to get 3 points in each round and so it needed three rounds to reach 40 points. Many answers of 14 suggested that the specific definition of ‘round’ was not used, and the calculation given was for ‘turns’ by one player.

- (b)** Many candidates correctly counted the adjacent squares, but some merely counted all the unused squares. A few candidates only counted squares both adjacent to and in the same column as an existing tile.
- (c) (i)** Some candidates did not spot all the repeats and a few did not identify any lines worth 0 points.
- (ii)** Most candidates identified the two correctly, but some gave three, which should have been seen as obviously wrong when the question asked for 'the two tiles'.
- (d)** Many candidates correctly identified the number and location, but did not explain why it was the unique solution; they just confirmed that it was a solution.
- (e) (i)** Some responses were generic statements that would necessarily be true given the unique answer; the explanation required was one based on the specific scenario: which ones were excluded for which reason(s). Where there was more than one reason for rejection, any one reason would suffice.
- (ii)** Half of the candidates picked both tiles and placed them correctly, although some indications of locations were very vague.
- (f)** Many candidates showed that they had not fully understood the bag and the numbers under the grid by referring to tiles held by one or other player (in the style of Scrabble). Many observed that 1 and 7 were missing, and some did identify the correct place, but few noted that it must be a 2, despite giving away a point, and some of those did not explain why only the 2 would do.

THINKING SKILLS

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

For all questions, but especially those offering more than one mark, it is prudent to show some working, with at least as many identified numbers (or observations) as there are marks. This working needs to be on the Answer Booklet since no marks can be given for working on the question paper, which is not seen by Examiners. A few candidates indicated that they had done working on the question paper. Working should not be crossed out unless it has been rejected and replaced by another attempt.

General comments

Most candidates attempted all of the questions and there were many clear and fully correct answers. Most of the candidates were able to do at least part of each question.

Although some candidates may be more familiar with non-metric measurements and some with non-dollar currencies, it is almost always prudent to use the units specified in the question. Within a response to a question, two different units should not use the same abbreviation, such as *h* for house and for hour or *m* for metre and mile.

Numbers in questions are often chosen to make the calculations easier, so runners may seem slightly slow or cyclists fast, but answers can generally be checked with common sense. For example, 40 pictures probably do not require 100 large display boards. However, candidates should not assume that the dollars are US dollars.

Questions often start with a 'show that' part. Candidates who do not get the same answer as the one given in the paper should check if they have overlooked some significant detail or misread the information. It is rare to get many marks in subsequent parts if a critical detail has been missed.

Comments on specific questions

Question 1

- (a) Most candidates found most of the costs, but a few offered more than five, which is what the question identified as a full set. Offering too many is a strong indication that they had not noticed the constraint on using all the journeys allowed.
- (b) Most candidates offered a fully-correct response. A few candidates only answered one aspect: either the minimum cost or the way to achieve it.
- (c) (i) Many candidates did not take account of there being two journeys each day: the maximum should have been found from 20 per cent of trains, not simply 20 per cent of relevant days.

(ii) The comparison needed the minimum of one figure and the maximum of the other. Few candidates calculated the relevant figures. Some candidates noted that the numbers were sufficient to qualify under the new system, but most made no mention of this.

Some candidates understood the information for **part (c)** in a different way to that which was intended. Full credit was awarded for taking the correct problem-solving approach but using certain wrong values.

- (d) This part required candidates to see that the optimal structures had three runs of seven consecutive days that crossed calendar weeks, rather than dealing with each calendar week separately. Only a few candidates spotted that the 7 days did not have to be in a calendar week. Very few then selected the timing of these runs to use the maximum possible extra days at the beginning to give the latest date for the required day off.

Question 2

This question about fitting pictures in different orientations needed separate analysis of the vertical and horizontal constraints. Those who tried to use just the surface area were not successful, as the area of landscape and portrait are the same.

- (a) (i) To show that 3 is the largest number possible requires both that 3 is possible and that 4 is not, or that there is a fractional limit between 3 and 4 making 3 the largest whole number. Most calculated the minimum height for 3 and then either noted that there was not enough space for another or calculated the minimum for 4 and showed it was too much. A few used an algebraic approach to get a limit between 3 and 4 and then rounded down correctly. Candidates using any of these methods were often out by 10 cm, forgetting that there is always one fewer gap than the number of items in a row.
- (ii) Half of the candidates correctly shared out the difference between what was needed and what was available equally between the gaps.
- (b) The scenario involved multiple boards and it was correctly answered by most, but some candidates ignored the distance from the edge of board on which it was placed and just made one larger display.
- (c) Many candidates assumed that all the boards still had to be the same size, and so did not find the optimal solution.
- (d) (i) One in five did not attempt this part, and one in five offered the correct answer.
- (ii) Candidates who simply turned the board on its side and came up with the same answer as before did not find the answer here, nor had they done the groundwork necessary for the next part.
- (e) Most candidates did not attempt this part.

Question 3

Some candidates did not engage with the logical constraints but offered a variety of creative but irrelevant suggestions based on features such as the letters in the nicknames, rhymes or supposed hidden messages. Scores in this question, which required logical deduction but no arithmetic, were generally lower than in the others.

- (a) Some candidates wrote down the two possible values for each person (or each nickname) but did not identify that there are just two possibilities for all three.
- (b) This part called for a systematic listing of all the matching not already excluded by the information given so far: $R = A$, $Q \neq B$, $S \neq D$, $T \neq E$. Missing any one of these constraints resulted in a very long list, but even those who gave most or all of the correct possibilities often included repeated columns.
- (c) Although this question specified 'with reference to the columns in **3(b)**', very few candidates made any reference to the columns, and those that did not rarely made progress.
- (d) This part was often done well, even by those who had not managed **3(b)**. The steps in reasoning were called for, so a lucky guess that happened to fit did not get full marks.

Question 4

- (a) (i) Most candidates offered a correct equation, but in many cases it appeared to be checking their figures to convince themselves rather than presenting it for a reader. The items should at least be labelled with a word. A sentence would be ideal, but a paragraph a waste of time.

- (ii) The majority of candidates calculated the time correctly.
- (b)(i) Most candidates spotted that houses gave the best rate of income, but not all used up the extra time when there was less than 40 minutes for a house but still time to do something else.
- (ii) Many candidates observed that apartments gave the lowest return, but plenty did not take note that there were only 15 of them, and so at least 90 more minutes was needed to get to the minimum time for a day.
- (c) Some candidates made errors in the calculations, which resulted in final answers in the thousands. Candidates should be encouraged to see if their answers are credible in the given context. Needing hundreds of people full time to clean the windows of each house on an estate clearly is not.
- (d) Many candidates correctly answered both parts, although a third did not attempt this part.
- (e) Two in five did not attempt this part. Some candidates put the costs as income rather than expenditure. The care needed to distinguish what was involved every week and what just on working weeks was not always taken, and a few rounded down instead of up or left a fractional result.

THINKING SKILLS

<p>Paper 9694/33 Problem Analysis and Solution</p>
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THINKING SKILLS

Paper 9694/41
Applied Reasoning

Key messages

- In **Question 1**, including **part (c)**, most candidates did attempt to analyse the structure.
- In **Question 2** almost all candidates did as they were asked and attempted to evaluate the reasoning.
- In **Question 3(b)** many candidates struggled to gain marks.
- In **Question 4** most candidates created their own argument structure but few engaged *critically* with the documents provided.

General comments

Most candidates appeared to have enough time to finish the paper. The standard of candidates varied greatly but there was evidence that some candidates had been well prepared.

Comments on specific questions

Question 1

All parts of **Question 1** rewarded the well-prepared candidate. Those who knew what was expected usually gained at least 4 of the 8 marks for analysis. As ever, some candidates were unaware that quoting from the text is required in this question.

- (a) Most candidates attempted to identify the main conclusion but only a minority were successful in this regard. Many identified an element that was not the main conclusion – often the final sentence. Many wrote the correct answer but included the preceding element in the first half of the sentence.
- (b) For candidates who understood the task, it was common to award at least one mark. Most candidates followed the instruction to give only two answers but many gave three and the third was not credited. Attempts at the final option on the mark scheme often included the first half of the sentence and so were not credited.
- (c) Candidates were required to identify (by stating) parts of the paragraph as individual argument elements and, for full credit, to demonstrate relationships between any elements that had been identified. More candidates knew what was required of this style of question than in 2021 and the full range of marks was seen. Some responses summarised the meaning of the paragraph, others evaluated it and some attempted to counter the reasoning. Of those candidates who attempted analysis, some paraphrased the elements (rather than stating them word-for-word), some omitted to name the elements and some omitted to demonstrate relationships between them.
- (d) Many candidates were able to gain a mark for identifying the assumption that actor politicians were contributing to the global instability. However, many candidates implied or stated that actor politicians were the only cause of global instability, an assumption that was more extreme than that relied upon by the reasoning.

Question 2

- (a) Most candidates were aware of the nature of the task and attempted an evaluation. As ever, little credit was given to responses that directly countered points given in the argument. Generic statements like ‘there is no evidence to back this up’ or ‘we do not know the source’ were also common but were not credited. Most candidates gained at least one mark, but relatively well

prepared candidates were often able to gain three or four. Most of the points on the mark scheme were seen by Examiners, although the slippery slope in paragraph 2 was the most common. Unusually, many candidates were able to successfully address one or more of the questionable assumptions.

- (b) This question required candidates to explain the extent of the support given by the reasoning in a single paragraph to the argument as a whole. Many candidates achieved one mark but struggled to gain more. Uncreditworthy responses often identified a weakness but did not assess its impact on the rest of the argument, or made a judgment about the strength of support that was itself unsupported by reference to the paragraph or by any explanation.

Question 3

- (a) Most candidates were able to gain at least one mark and some gained two. Versions of all the marking points were seen. A significant minority of candidates addressed problems with the document as a whole or the apparent inconsistency between the claim about Taylor Swift and the information in the graph.
- (b) Candidates struggled to gain more than one mark on this question and responses were often briefer than **part (a)**, which had a lower mark tariff. Many candidates noticed that the perceived influence of celebrities and politicians on the views of others were similar and many noticed that there was an issue with asking people what they thought; but few could explain this well enough to gain more than a single mark. Versions of most of the other marking points were seen, but rarely. Many candidates questioned the number, or representativeness, of survey respondents; however, as they had been told in the question that the sample was large and representative, such answers were not credited.

Question 4

Candidates were required to use the documents to construct a reasoned case to support or challenge the conclusion that celebrity involvement is bad for politics. Most were able to engage with this topic, with the majority arguing against the given conclusion. Almost all candidates attempted to construct their own arguments, with very few relying on sequentially summarising the documents. There was a noticeable increase in the average length of responses to **Question 4** this series. In some cases, the increased length represented an increase in the standard of response; however, some longer responses struggled to retain focus and coherence. Many candidates attempted to arrange their ideas into strands of reasoning that each supported a clear intermediate conclusion, but often these strands contained little sequential reasoning and, hence, did not have a clear intermediate conclusion. Hence, many responses were unable to score higher than Level 1 for the structure skill. Few candidates were using the documents with a critical eye, which meant the marks for 'use of documents' were often restricted to Level 1. Arguments supporting the conclusion were strengthened by effectively addressing the issue of problems with career politicians; those challenging the conclusion were strengthened if they included effective responses to celebrities' potential lack of expertise or charges of 'dumbing down' politics. A number of candidates opted for a compromise, concluding, often reasonably, that there were some good and bad aspects of celebrity involvement in politics. However, the question requires that candidates argue for or against the given conclusion and arguments that do not do just that are not likely to score highly in the 'quality of argument' skill. It is worth reminding centres that what is likely to get high marks is a persuasive argument that strongly supports or challenges the given conclusion with a clear structure that is supported by thoughtful, particularly critical, use of the documents and that convincingly addresses relevant alternative viewpoints.

THINKING SKILLS

<p>Paper 9694/42 Applied Reasoning</p>
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Key messages

- In **Question 1**, including **part (c)**, most candidates did attempt to analyse the structure.
- In **Question 2** most candidates did as they were asked and attempted to evaluate the reasoning.
- In **Question 3** many candidates struggled to gain marks.
- In **Question 4** most candidates created their own argument structure but few engaged *critically* with the documents provided.

General comments

Most candidates appeared to have enough time to finish the paper. The few candidates that may have run out of time had written disproportionately long answers for the earlier, lower-tariff questions. The standard of candidates varied greatly but there was evidence that some candidates had been well prepared.

Comments on specific questions

Question 1

All parts of **Question 1** rewarded the well-prepared candidate. Those who knew what was expected and attempted to analyse the argument usually gained at least 4 of the 8 marks for analysis. As ever, some candidates were unaware that quoting from the text is an appropriate, in fact a required, way to answer this question.

- (a) Most candidates attempted to identify the main conclusion, as they had been asked to, but only a minority were successful in this regard. Many identified an element that was not the main conclusion – usually one of the intermediate conclusions. Many wrote the correct answer but included ‘they harm society’ which represented an argument element other than the main conclusion. Some candidates gave the gist of the argument.
- (b) For candidates who understood the task, it was common to award at least 2 marks. Most candidates followed the instruction to give only three answers. The fourth option in the mark scheme was seen less often than the others.
- (c) Candidates were required to identify (by stating) parts of the paragraph as individual argument elements and, for full credit, to demonstrate relationships between any elements that had been identified. More candidates knew what was required of this style of question than in 2021 and the full range of marks was seen. Some responses summarised the meaning of the paragraph, others evaluated it and some attempted to counter the reasoning. Of those candidates who attempted analysis, many paraphrased the elements (rather than stating them word-for-word), many omitted to name the elements and many omitted to demonstrate relationships between them.

Question 2

- (a) Most candidates were aware of the nature of the task and attempted an evaluation. As ever, responses that directly countered points given in the argument were not credited, nor were generic statements like ‘there is no evidence to back this up’ or ‘we do not know the source’. Many candidates scored 0, but relatively well-prepared candidates were often able to gain at least three marks. Although use of the correct technical term is not essential for the award of both marks for a single weakness, it was common to award one mark for incomplete versions of the points on the

mark scheme, either because the identified flaw was incorrectly named or because the explanation of an un-named flaw was not sufficiently good.

- (b) This question required candidates to explain the extent of the support given by the reasoning in a single paragraph to the argument as a whole. Few candidates achieved more than one mark and many scored no marks. Uncreditworthy responses often identified a weakness but did not assess its impact on the rest of the argument, or made a judgment about the strength of support that was itself unsupported by reference to the paragraph or by any explanation.

Question 3

Candidates appeared to know what type of answer was expected and most limited the length of their responses to match the number of marks available for the question.

Candidates were presented with a table and asked to explain why the support given by the graph, to an inference drawn from it, was weak. Marks awarded ranged from 0 to 4. Candidates routinely addressed three potential sources of weakness, as instructed. However, the question asked candidates to explain any weaknesses they had identified, which meant that it was common to award one mark for a correct weakness, rather than two because points were not sufficiently well explained. Most commonly, candidates gained marks for noticing that 'people out of work' is not the same as 'money spent on unemployment relief' and that the table did not state which of the countries shown were socialist or capitalist. All other points on the mark scheme were seen.

Question 4

Candidates were required to use the documents to construct a reasoned case to support or challenge the conclusion that socialism is better than capitalism. Most were able to engage with this topic, with the majority arguing against the given conclusion. Almost all candidates attempted to construct their own arguments, with very few relying on sequentially summarising the documents. Some candidates were able to arrange their ideas into strands of reasoning that each supported a clear intermediate conclusion and, hence, score higher than Level 1 for the structure skill. Few candidates were using the documents with a critical eye, which meant the marks for 'use of documents' were often restricted to Level 1. Arguments supporting the conclusion were strengthened by effectively addressing the issue of wealth-creation in a socialist system; those challenging the conclusion were strengthened if they included effective responses to the existence of poverty or inequality associated with a capitalist system. A number of candidates opted for a compromise, concluding, often reasonably, that the best system would combine a mixture of both ideologies. However, the question requires that candidates argue for or against the given conclusion and arguments that do not do just that are not likely to score highly in the 'quality of argument' skill. It is worth reminding centres that what is likely to get high marks is a persuasive argument that supports or challenges the given conclusion with a clear structure that is supported by thoughtful, particularly critical, use of the documents and that thoughtfully considers relevant alternative viewpoints.

THINKING SKILLS

Paper 9694/43
Applied Reasoning

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