THINKING SKILLS

> **Paper 9694/11**
> **Problem Solving**

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 marks are 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 marks.

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. On this occasion, 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, and frequently the candidate, 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 engage with these numbers as the core of their explanation.

General comments

This was the first sitting of this new style of paper, previously multiple choice, and in general candidates engaged very well with it. It is acknowledged that preparation may have been 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)   This part was often correctly answered. The common error was to identify only location A.

(b)   Most candidates appreciated that the travel restriction of 40 km was still applicable, and thus that locations *A* and *C* were not possible. However, they deduced from this that since *B* offered swimming, it would be Tanya's choice. A complete argument required location *D* to be ruled out on the grounds that it did not offer swimming, though it did meet the travel restriction.

Question 2

A significant minority of candidates did not grasp the premise of this question and did not deal appropriately with the concept of the fixed fee. A common error was to add the two costs together, giving $22 and then divide by the total number of letters on the two mugs, leading to $1.60. For Penelope's mug with 8 letters, this incorrect $1.60 was multiplied by 8. Some candidates successfully found the cost per letter, but then gave this as their answer.

Question 3

Most candidates were able to find the cost of Alexander's parking to be $0.75. This was often followed by multiplying the remaining $0.25 by 2 to give 50 minutes of parking, thereby neglecting the fact that the rate changes after 3 hours.

Question 4

The majority of candidates made a very good attempt at this question, with many scoring full marks. It is worth noting that candidates could use the given table to good effect by annotating it to help in interpreting all the given information. Many answers were very wordy and contained a lot of superfluous repetition of the information in the question.

Question 5

(a) This part was often answered correctly. The most common error was to assume that there was a ferry awaiting Kenny at his chosen time of 12:00, and that he could arrive on the island 25 minutes after that. The reality is that he must wait for a scheduled ferry, and this departs at 12:20 and arrives at 12:45. A similar assumption was then made for the return journey.

(b) Responses to this part showed great invention but almost always missed the point of what was being asked. The reason that every ferry cannot carry a full load of tourists is that there are more ferries returning from the island than going to it, so all the returning ferries cannot be full. Suggested reasons included comments about safety, the weather and even the pandemic, as well as the assumption that all the people who went to the island on one ferry had to return together as a group.

(c) (i) A common answer to this part was 120. Candidates correctly found that four ferries carrying up to 30 people each would arrive on the island by 11:30 and gave this as their answer, scoring just one mark. They did not allow for the fact that the returning 11:00 ferry had already left with at least 5 tourists on board, so the greatest number of people on the island could only be 115.

(ii) A similar error was common in this part. The least number of tourists who could have arrived on the four ferries prior to 11:30 was 20, but 15 of these tourists could have left on the returning 11:00 ferry, leaving a least possible number of tourists on the island as 5.

Question 6

Most candidates made a good attempt at this question and worked through it methodically. They deduced that the total amount paid by the members for their tickets is 136 times $40. Subtracting this from the given total of $9140 leaves $3700 which must be made up of 74 guests paying $50 each. At this stage, errors occurred in collating the information to deduce the number of members who did not attend.

Question 7

(a) With the information that George would complete 100 records a day before training and 140 a day after training, those candidates who used a systematic approach in this part were often successful. Some produced very elaborate timetables with an hour-by-hour breakdown of progress, others gave less detail, working on a day-by-day basis, but were equally effective. Other candidates covered the page with numbers and times that were very difficult for the Examiner (and seemingly the candidate) to follow, and rarely led to a correct answer.

(b) Less than a third of candidates were able to make any progress on this part. Some candidates began by finding the saving to the company, but only a handful were able to follow this through to a calculation that led to the correct number of records. Even those candidates who had a systematic approach to **part (a)** declined to adopt a similar approach in this part.

Question 8

A significant minority of candidates did not seem to understand the mechanism by which the passcodes were constructed and therefore made no useful progress in this question.

(a) Of those candidates who grasped the mechanism, most gave the correct answers of 0 and 7. In the incorrect answers, the 7 was almost always present. It seemed that some candidates did not appreciate that 0 was a permissible digit and in the absence of this included a random other digit to accompany the 7.

(b) Of those candidates who made any progress in this question, most were usually able to write down one or two possible passcodes satisfying the criteria, but very few were able to list or state that there were 16 in total.

(c) This was answered well by those candidates who were confident with the structure of the passcodes in this question.

Question 9

This question proved challenging to many candidates, perhaps because there was a lot of information to absorb.

(a) There were relatively few fully correct solutions to this part of the question. The recommended approach is to look at the information piece by piece to see what can be deduced at that stage. The size of each box enables the candidate to find how many candles fit into each type of box, and therefore how many boxes of each type would be needed. This can then be related to the cost of delivery of each type of box. Many candidates seemed to pluck numbers from thin air, with no evidence to help the Examiner to understand their thinking. Equally, these numbers were often thousands of dollars, and candidates would be advised to think about whether their answers are in any way realistic. Of those who made a reasonable attempt, a common error was to assume that a cuboid was the better option, without any justification or apparent consideration of the cube. Some candidates omitted the cost of the boxes and/or the delivery charges.

(b) The vast majority of candidates made little progress in this part and many did not make any attempt. A few candidates found a combination of cubes and cuboids that gave an amount for an order of more than 200 candles, but hardly any made an attempt to improve their search.

Question 10

(a) The common answers to this part were 5 (correct) and 6 (incorrect) in almost equal measure. A helpful starting point in this question was to use the given information to label the sectors of the pie chart with the days of the week and credit was given for this first step. Candidates who did this usually obtained the correct answer. Those who gave the incorrect answer of 6 rarely gave any evidence in support of their answer.

(b) About half of the candidates made the error of assuming that the answer corresponded to the largest sector in the pie chart, failing to connect with the first part of the question and/or misunderstanding the new information given.

Question 11

Most candidates found this question very challenging.

There were some excellent solutions to the question, but the majority of candidates did not give explanations with sufficient detail to enable any marks to be awarded. Sometimes the Examiner had a sense that the candidate had some understanding of the problem, but without this being expressed clearly no marks could be awarded. The key to this problem was to understand how many points teams could score in two different scenarios, and candidates are advised that in such scenarios, it is better to work with the concrete information given rather than talk in abstract terms. Some reference to the total points numbers were an essential part of any acceptable explanation.

(a) There are two key features that are required to give a satisfactory explanation in this part. Firstly, the team with 94 points can attain 100 points in total by winning their match. Secondly, one of the teams with 98 and 97 points can attain 100 points in total by drawing their match against the other. So, two teams can finish with 100 points.

(b) The explanation required in this part is more extended than in **part (a)**, but again reference to the total numbers of points attainable by the teams in different scenarios is required. Candidates should work with the practical details to support their argument, rather than to try to offer an explanation in words devoid of any detail. Very few candidates made any significant progress in this part.

Question 12

There was some evidence to suggest that some candidates were running out of time and could not give sufficient attention to this question.

(a) A common error in this part was to give an answer of 10 instead of 9, presumably including the occasion at 12:05 when all the bulbs are lit. Candidates should note that any words in bold type are there to draw attention to them. Here the words **more** and **before** are to emphasise the beginning and end of the time interval being considered.

(b) Many candidates deduced that at the stated time the red and white bulbs were on, but the red ones were not. Unfortunately, they did not translate this into a proportion of or $\frac{2}{3}$ or 2 out of 3.

(c) (i) There were some excellent answers to this part, always by candidates who drew up a systematic listing of which bulbs were on at successive seconds. This then helped them to identify which colours were lit at any given second in time. However, many candidates simply stated an incorrect number with no working.

(ii) Those candidates who drew up a listing in **part (i)** were able to answer this part successfully with no further work.

THINKING SKILLS

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Paper 9694/12
Problem Solving
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Key messages

Working should be kept as logical and neatly laid out as possible. A lot of working was seen randomly placed in the available space and one part not following on from the next. Candidates who made correct starts regularly appeared unable to follow their own working.

Candidates need to read all information given to them carefully before answering the questions and again after to make sure they have completed the question. Lack of care reading the information was particularly noticeable in **Questions 4bi, 5, 7, 8a, 11a** and **12b**.

General comments

There was a wide range of scores seen and the more able candidates were able to tackle most of the questions and achieve good marks.

Most candidates were able to engage with some of the questions.

This was the first sitting of this paper so preparation may have been more difficult. This will become less of an issue over time.

Comments on specific questions

Question 1

Whilst about a third of candidates answered this question correctly, it was clear that many did not understand the concept of a fixed fee. Some candidates successfully found the cost per letter but gave this as their final answer and were unable to use this to go on to find the fixed fee. The difference between the costs was often seen as an answer. A common error was dividing the total cost of the cake by the number of letters iced.

Question 2

The majority of candidates were able to make progress on this question, with most scoring at least one mark, usually for arriving at an answer of $160. Only about a fifth scored full marks. Candidates showed little evidence of working with costs per person to decide which group gave best value for money and relied on trial and improvement type methods. Common misconceptions included assuming the groups had to be all different sizes or all the same size. Several candidates worked with the bottom end of groups allowing the minimum number of visitors for the cost rather than the maximum.

Question 3

This question was generally answered well and candidates of all abilities were able to make a start and score marks. A variety of methods were seen. The more able candidates used more sophisticated methods such as combinations where the less able used listing methods. The importance of reading the question carefully was demonstrated here, as several found the correct number of choices for each person but did not finish the question by finding the difference between these values. A number of candidates doubled all the relevant values as they did not realise reversing the flavours made the same combination. These candidates tended to use the less sophisticated listing method.

Question 4

(a) The majority of candidates answered this question well, with most who scored achieving full marks. Candidates who failed to score had generally misunderstood the instruction that the second film to be seen was the next one to start after the first had finished. Several candidates used the same film twice or used the next film in the list (Outrageous Fortune in Studio 3) rather than the next film to start. Several candidates potentially lost marks because of the limited information they showed, such as stating the second film to be seen was Take Arms but omitting that it started at 17:10.

(b) (i) About half of the candidates answered this question correctly. Reading the question carefully was again an issue. The question was relatively straightforward, simply needing to multiply 6 by 250 to find the answer, however a significant number went on to find the weekly number of seats available rather than the daily number. Several candidates tried to use the information on money raised from ticket sales within their answer.

(ii) Almost three quarters of the candidates failed to score on this question. In order to start scoring candidates must recognise that as many as possible of the $8 tickets must be sold to achieve the minimum possible number of tickets sold. Most candidates that started the question with the correct assumption went onto score full marks. A large proportion of the candidates scoring 0 started with the assumption that they had to sell all the $5 tickets, then worked out how many extra $8 tickets were sold to make up the money raised from sales. Their method was generally correct except they worked out the maximum possible number of tickets sold rather than the minimum.

Question 5

A lot of information was given in this question and it needed to be read carefully to obtain everything needed to successfully answer it. Only a minority of candidates scored full marks. It was noticeable that these candidates tended to be very logical in their layout of the question, working week by week. A small number of these candidates lost a mark by forgetting to add on the final $125. A significant number of candidates were able to earn one mark on this question, usually for reducing the $75 prize to $70 to give the two winners a multiple of $5 each. Many candidates included the $765 original horde in their calculations, not realising that, as the entire horde had been won, there was nothing to be carried forward to the next week.

Question 6

More than half the candidates managed to score full marks on this question. Two main methods were seen: algebra and variations on trial and improvement. Candidates seemed to be able to solve the simultaneous equations they had set up but errors were often made with the original equations. Common errors included using the same letter to stand for different flowers and multiplying by the extra bulbs rather than adding. Trial and improvement methods varied, from trying numbers that fitted the conditions for the bulbs grown and checking if they added to 54, to starting with 54 divided by 3 = 18 bulbs for each flower then manipulating these figures to fit the other conditions. Both main variations were equally successful. Several candidates lost the final mark by giving the number of tulips or hyacinths that grew rather than daffodils.

Question 7

Candidates found the whole of this question challenging. The most successful made a list of real times and clock times alongside each other and labelled each column clearly. Candidates who tried this but did not label the columns often got confused as to which time was which. A number of candidates misunderstood the pattern and rather than continuing the pattern, they repeated the pattern given. Candidates who tried to work with the differences in the times rather than the actual times were rarely successful.

(a) Several candidates misunderstood how much time the clock was losing and worked with a loss of 2 minutes per hour followed by 3 minutes per hour etc.

(b) A significant problem with this part of the question was candidates not recognising that there was only half an hour of the clock moving at a third speed, rather than an hour. A lot of candidates simply changed the information given in the question so they were working in full hours, e.g. 03:30 to 04:30 the clock was moving forward one minute for every three in real time.

Question 8

(a)   Most candidates scored at least one mark on this question with more than half scoring full marks. The final mark was often lost because the $25 cost of the card was neglected or because of trivial arithmetic errors. Some who scored 0 confused the number of times gone annually with times gone monthly.

(b)   This question was answered poorly with very few candidates scoring. Candidates who scored one mark generally worked with the maximum that could be charged to make it cheaper, rather than the minimum. A significant number of candidates gave an answer with little or no working, implying it was probably a guess. A common error was candidates not taking on board that this was a new system being proposed and continuing to use the $25 from **part (a)**. Several candidates turned the question into an annual rather than a monthly situation and made the question more complex.

Question 9

All parts of this question proved to be very difficult for the candidates. Working was generally very poorly laid out, often just percentages written with no indication as to their meaning. It was difficult in many cases to work out what was intended to be an answer.

(a)   This question required the candidates to recognise that the 80 per cent who voted for independence represented 20 per cent of the population of the district, so the 20 per cent who voted against independence represented 5 per cent of the population of the district. Very few candidates scored any marks. Successful candidates generally laid their work out logically, briefly explaining what each percentage represented. Many more candidates could potentially have scored 1 mark, awarded for 20 per cent of adult members of the district voted for independence. 20 per cent on its own was not sufficient as it could have been obtained in more than one way.

(b)   Only candidates who scored full marks on **part (a)**, scored on this question, which was relatively straightforward, had the previous answer been correct. After the difficulties of **part (a)**, almost a third of candidates did not attempt this question.

(c)   This question was answered very poorly with many candidates not attempting to answer. Most candidates who did score showed little or no relevant working, so it is possible they arrived at the correct answer fortuitously.

Question 10

This question was answered poorly. A diagram, including grid lines, was provided to assist candidates but very few showed any evidence of using it. The main difficulty for candidates was caused by not realising that, if the two sea monsters could always see each other, any angles showing on the riverbed had to be concave.

(a) (i)   The most common incorrect answer seen was 3, where candidates had assumed a diagonal line from the riverbank through the given depth. They had not recognised that the riverbed could be horizontal.

(ii)   This was the most successfully answered part of the question, as the diagonal from the riverbank was needed to answer this. Some used proportion to answer this question and, as the distance from the bank had doubled, so had the depth.

(ii)   This was the least successfully answered part of the question, as it needed the candidate to recognise that the first situation required a horizontal bed and the second a slope, and that this could not happen at the same time. As very few had thought about the horizontal possibility in **part (a)**, it made it very unlikely they could score on this part.

(b) (i)   A few candidates were able to find the width of the channel for boats as 20 m, but none were able to give its location. This question could be answered quite simply using the diagram by joining the given plots with straight lines and reading off the 7-metre depth and distances from the bank. No use of the diagram in this way was seen.

(ii)   As in previous parts, use of the diagram could have assisted significantly in finding the maximum depth.

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Question 11

There was a lot of information given in this question and careful reading was essential. Many marks were lost because of one piece of given information being neglected.

(a) This question required four numbers to be multiplied together and whilst most candidates realised what method should be used, there was often one or more of the relevant bits of information missing. The most common error was missing that the four contestants' scores were added together, so an answer of $1200, being a quarter of the correct answer, was frequently seen. The next most common omission was awarding 5 points for each correct answer and just using the number of correct answers instead of points.

(b) It was expected that most candidates would tackle this question using a trial and improvement/search method. The easiest method to use was to total the individual scores and work with the 96 possible questions; however, a large number chose to work with the four contestants separately, which increased the level of difficulty of the question significantly. Most candidates who made progress with the individuals but did not reach the correct answer only scored 1 mark. A common incorrect method was to divide each of the totals by the five points awarded for a correct answer and add the truncated values.

(c) Most candidates who attempted this question managed to score at least one mark. This was for recognising that Clare had won half the pot so the total pot must have been $4100. Only a few candidates recognised that the question asked for the value of the pot at the beginning of the show so the additional prize added during that show had to be deducted.

Question 12

As the final question on the paper, it was obvious that a number of candidates had insufficient time to work through it carefully and a significant number made no attempt at all.

(a) An answer to a situation was given to the candidates and they were asked to explain how it was obtained. Many candidates clearly did not understand that the Examiner needed to see the calculations used to obtain the answer in this case and to be able to understand where it came from. A large number of candidates subtracted two numbers that did not appear to come from the information given, to come up with an answer of 5, but rarely showed how those numbers had been obtained. E.g. 30 – 25 = 5.

(b) This question required careful layout and thought. Candidates who listed the six possibilities tended to perform better than those who just worked with the numbers alone. It appeared from the working that a lot of candidates tried to work only with the information given in **part (a)** and ignored, or did not notice, the extra information given in **part (b)**. Without the additional information, the question could not be answered without guessing.

THINKING SKILLS

| Paper 9694/13 |
| Problem Solving |

Key messages

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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. On this occasion, 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, and frequently the candidate, 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 engage with these numbers as the core of their explanation.

General comments

This was the first sitting of this new style of paper, previously multiple choice, and in general, candidates engaged very well with it. It is acknowledged that preparation may have been 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

More than half the candidates scored full marks on this question. A lot of information was given in the question and a good method of approach is to note what is being asked for, namely the number of urgent appointments, and then work through the information systematically. Of the three full time doctors, one has 32 urgent slots and the other two have one quarter of 32, namely 8, each. The two half day doctors have one quarter of 16, namely 4 each reserved for urgent slots. This gives a total of 32 + 8 + 8 + 4 + 4 = 56 urgent slots. The most common error was to allocate the slots of all three full time doctors as urgent, giving 96 slots and leading to an answer of 104.

Question 2

(a)   A surprising number of candidates did not obtain the correct total number of routes that go through all the towns. Routes that only go through some of the towns were also included.

(b)   This part was answered well by almost all candidates.

Question 3

The majority of the attempts at this question earned only partial credit. Most candidates showed that if the cost of chocolate biscuits was $2 then the cost of plain biscuits must be $8. This was usually followed by a comment to the effect that plain biscuits cannot cost more than chocolate biscuits. Whilst this may be likely,

the comment does not address the question as it is posed. Candidates need to show that $2 is not the only possible cost of chocolate biscuits by finding an alternative pair of numbers which satisfy the given requirement. Chocolate biscuits could cost $5 (with plain biscuits costing $3) and so $2 is not necessarily a correct deduction from the given information.

Question 4

Candidates found this question challenging. The main problems seemed to be in interpreting the train timetable and in understanding the given information for both Ferdo's journey and Derin's journey.

(a)   We are told that Ferdo catches the first train from Juno after 08:30 and this is the 08:35. He travels to Odiham and stays there for at least two hours. A common error was to deduce from this that the train took two hours to arrive in Odiham, whereas it arrives there 50 minutes after departure, at 09:25. Ferdo now remains in Odiham until 11:25, leaving on the first possible train after that, at 11:40 and arriving in Juno at 12:30. Again, the time for the journey was sometimes assumed to be two hours.

(b)   This part requires the candidate to work backwards through Derin's journey. This caused problems for many candidates, not helped by their apparent difficulties in reading the train timetable.

Question 5

(a)   About half of the candidates grasped the concept here and worked logically with the given information. The most straightforward approach is to consider the 900 minutes between 7:30 am, when the clock is correct, and 10:30 pm. The hands of the clock are moving at 95 per cent of their proper speed, so only cover 855 minutes. This means that when the real time is 10:30 pm the clock shows 9:45 pm.

(b)   A very common error in this part occurred in converting a number of hours expressed as a decimal into hours and minutes. The common assumption was that there are 100 minutes in an hour.

Question 6

Many candidates scored full marks in this question.

(a)   The most common error in this part, and it was only made by a minority of candidates, was to find the two members of the squad who were born in the same year and were closest in age to each other, namely K. Elder and H. Lime.

(b)   This was almost always answered correctly.

(c)   This was almost always answered correctly.

Question 7

Many candidates scored full marks in this question.

(a)   The majority of candidates worked out the cost using each of the two vouchers and then stated which was the cheaper.

(b)   Again, the majority of candidates worked out the cost using each of the two vouchers and then stated which was the cheaper.

(c)   The most common method adopted in this part was to assume that the cost of the dessert was x, find expressions for the cost using each voucher and then equate them. Algebra is not assumed knowledge, but an equivalent solution in words is equally effective.

Question 8

This question is based on an unfamiliar situation and it was pleasing to see that over half of the candidates navigated the description successfully and scored most of the available marks.

(a)(i)   Most candidates described clearly and briefly the three jolts leading to 1, 2 and 2 points.

(ii) Most candidates filled in one square on the diagram to make the two tracks identical, thereby removing two twists. The remaining candidates made no attempt to answer this part.

(b) The maximum number of points occurs when the number of 5-point jolts is a maximum. This is when both tracks change at the same time. A pleasing number of candidates deduced the correct layout for the three missing stones, but a common error was to then calculate the points total as 12 instead of 14.
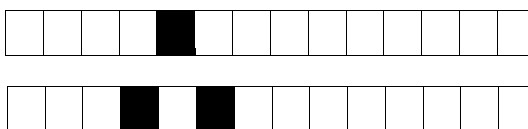
Question 9

(a) Almost all candidates identified page 21 as one of the three pages, and two thirds of the candidates correctly identified the other two pages as 51 and 52. There was no common error in the incorrect responses and it was not usually clear how candidates had made their deductions.

(b) Only a minority of candidates made any progress in this part. The successful attempts used the fact that the middle two pages of a newspaper with 52 and 90 on the same page must be midway between and numbered 70 and 71, leading to a total of 140 pages.

Question 10

Many candidates grasped the concept of this question and were able to use the information gained in the first two parts to good effect in the final two parts. However, the explanations offered in the first two parts were often less than convincing.

(a) (i) In the most common approach to this part, the first mark was for identifying that the 4th digit must be a 0 or a 5. This mark was often scored. The second mark was for identifying that a 5 would lead to a repeated 5 and a 0 would lead to at least one other 0 in the 5th or 6th position. This was not always explained clearly. A second approach depends on looking at the results when the number 5 is multiplied by an odd number and an even number. A common error in either approach was to give just a couple of examples and hope that these proved the result. It is worth noting that an explanation requires consideration of the general case and not just specific examples.

(ii) This part proved to be challenging. Only a minority of candidates gave convincing explanations. Again, a list of outcomes for various specific cases were offered as an explanation.

(b) This practical application came as welcome relief to most candidates, and most deduced the correct passcode beginning with a 3.

(c) About half of the candidates answered this correctly. Most of the others identified that the numbers 1, 3, 7 and 8 must appear in the passcode and were awarded 1 mark for this.

Question 11

Candidates found this question very challenging. The difficulty seemed to be in extracting the relevant pieces of information for each part.

(a) In this part we are only interested in what happens up until 10:00, so all other information can be ignored. The key facts are that by 10:00 the total takings were $50, the charge per car is $2 paid on exit and the number of spaces available is 43. It can therefore be deduced that 25 cars have paid and left the car park by 10:00 and there are 100 – 43 = 57 cars in the car park. This means that a total of 82 tickets must have been issued.

(b) Even partial attempts at this part were rare. It was necessary now to engage with the remaining information. A few candidates realised that 12:00 was a crucial time, when the charging system according to length of stay came into play. By 12:00 the total takings were $152, so 76 cars must have left the car park, paying $2 each. From there the best method of approach was to consider the takings in each hourly slot and search for what combination of $2 and $5 charges could have

summed to that total. There were no specific common errors in attempts at this part. Those candidates who began well either gave up or did not engage with the more complex situation after 12:00.

Question 12

(a)   This part was answered well by most candidates.

(b)   About one third of candidates successfully found a combination of boxes that satisfied the given condition. There were several different solutions to the problem, with a choice of which box was not included. Having chosen a box, the way forward was to halve the remaining total weight and aim to split the remaining 8 weights as equally as possible. This was usually achieved by trial and error. There was a sense that more candidates could have solved this problem if they had worked more tidily and not confused themselves with crossings out in the trial and error process.

THINKING SKILLS

Paper 9694/21
Critical Thinking

Key messages

Although this exam tests skills more than knowledge, the specification does identify some subject knowledge which candidates are expected to know, and it is impossible to perform well without knowing such items as reliability criteria, the meanings of the expressions 'argument element' and 'unstated assumption' and the names of certain flaws and weaknesses in reasoning.

General comments

Because the June 2020 examination session was cancelled, this was the first time the new specification and the new format for the exam were tested. The range of performance was similar to previous years.

Most candidates attempted the whole question paper. A few omitted part(s) of **Question 4**, which may have been through pressure of time (wisely giving priority to **Question 5**) or because they did not know how to attempt those questions.

Comments on specific questions

Section A

Topics for **Section A** may be drawn from any academic discipline. On this occasion, the subject area was history and to some extent literature.

Question 1

(a)   As on previous occasions, some candidates were unable to answer this question correctly because they apparently did not know the specialised meaning of the word 'argument' in Critical Thinking (and on the specification); for example, some said it was not an argument because it did not include an opposing view. On this occasion, however, some who evidently did know the technical meaning of the word judged wrongly that Source B was not an argument.

(b)   In order to be 'useful', a source must be both reliable and significant: so answers to this question could have referred to reliability and/or significance. On this occasion, so many valid comments were available for credit that it would have been possible to gain 3 marks out of 3 by focusing exclusively on either reliability or significance. A fair number of candidates made one comment which gained a mark, but very few achieved more. Some candidates interpreted the word 'how' in this question more narrowly than intended, commenting, for example, that the source gave a suggestion as to why he died, but not how.

(c)   A good number of candidates judged correctly that the addition of the question mark added nothing to the evidence that Marlowe's death was faked, because it was erected by people who believed that, but a similar proportion of candidates judged that it did add weight. Several candidates apparently missed the significance of the dates provided in the sources, because they made unrealistic claims, such as that the question mark showed Marlowe might still have been alive when the monument was erected, which must have been later than the foundation of the Marlowe Society in 1955.

(d)   Most candidates summarised or quoted the claims made in Source E without considering to what extent they succeeded in countering the claims in Source D, which is what the task required. The most popular judgement was that Source E countered the claims in Source D well, which was not correct. Some candidates wrongly claimed that Source E agreed with D, on the grounds that it repeated some of the claims (but it did so only in order to reject them). A few candidates gained 1 mark by correctly observing that the first half of the fourth sentence in Source E potentially supports, rather than countering, the hypothesis put forward in Source D. Very few candidates if any spotted that the cynical comment, 'mysteriously survived his own death' begs the question. Most candidates accepted too readily the claim in Source E that genius can somehow compensate for lack of education.

(e)   Most candidates attempted this question without referring to the five reliability criteria listed in the specification; however, some comments were close enough to one of these criteria to be credited. Most candidates judged wrongly that Source F was completely unreliable, because they thought that studying a subject at university imparted no expertise and a gap of fifty years completely negated ability to see. However, a fair number were awarded 1 mark for drawing attention to the significance of this 50-year gap. Many candidates said that the source was unreliable because it was someone's opinion or derived from a blog, but these comments were not credited, because the reliability of a blog or of an opinion depends on the reliability of its author, which was the focus of this question.

Question 2

This question elicited a very wide range of performance. There are three possible explanations for Marlowe's death, all of which are mentioned in the sources provided: he was killed in self-defence (sources A and B); he was murdered (Source C); or he faked his own death and escaped to Italy or France (Source D). Many candidates supported the official account of Marlowe's death as an act of self-defence, while a similar proportion either adopted one of the alternative explanations or rejected the official verdict without committing themselves to either of the alternatives (which in terms of the specific task set was acceptable). A few candidates declined to come to a judgement, even though that is what the task required, while a few arguments implied different conclusions from the ones their authors drew from them. The fact that some candidates apparently went back to their opening statement and added or deleted the word 'not' at least once in the light of their subsequent thinking suggests that they may not have taken the advice given on the question paper to plan their answer before beginning to write it; however, this was only a minority, and most may have followed the advice. Several candidates claimed that if Marlowe did not die in 1593 he is still alive. Some candidates limited their answers to lengthy summaries and/or discussions of only one or two of the sources, which limited the mark they could achieve.

Section B

Some candidates seem to have had difficulty in understanding the contrasts drawn at some points of the argument between the current state of affairs and the expected benefits of introducing UBI. For example, the author does not (as some candidates claimed) contradict himself in paragraph 4 when he claims that 'volunteers have become less available' but UBI 'gives people time to engage in voluntary work.'

Question 3

(a)   Many, but far from all, candidates correctly identified the main conclusion of the argument. A range of wrong answers was offered, none of which was particularly popular. The few candidates who summarised the gist of the argument in their own words instead of identifying the quotation from the passage which constituted the main conclusion were awarded 0 marks, because they had not attempted the correct task.

(b)   Most candidates correctly identified some intermediate conclusions, and a fair number achieved 6 marks out of 6. Every mark from 0 to 6 was instantiated. Some candidates who correctly identified 'UBI shares out fairly the benefits of technological advances' or 'The introduction of UBI enhances the quality of individual and community life' as intermediate conclusions lost a mark by adding the remainder of the respective sentences, which are in each case separate argument elements (reasons supporting the IC). Conversely, some candidates lost a mark by omitting the introductory words, 'The biggest benefit…' or 'The introduction of…'.Some candidates offered the first sentence of paragraph 5 as an answer, but that is the beginning of that strand of reasoning, and not its conclusion.

(c)   Some candidates were awarded 2 marks out of 2 for correctly identifying these words as a counter-assertion, while others achieved only 1 by saying it was a counter-argument. However, most candidates appeared not to know what this question was asking them to do and instead of identifying the argument element either paraphrased the quotation, argued against it or quoted the response given in the passage.

(d)   The word 'enough' was considered to be essential to a correct answer, and so candidates who said it was assumed that people would continue to work under a system of UBI without including 'enough' were awarded only 1 mark out of 2. As on previous occasions, some candidates cited quotations from the passage as unstated assumptions, apparently without realising that by definition such answers could not be correct.

Question 4

(a)   Some candidates argued against the reasoning in paragraph 3 instead of identifying weaknesses in that reasoning. Very few candidates if any spotted the most significant weakness in reasoning, namely that the author claims that improving family life is 'the biggest benefit' of UBI, without comparing it to any other benefit: this is a 'textbook example' of *inadequate support* (one of the 'weaknesses in reasoning' identified in the specification). Many candidates offered challenges to the reasoning: if they could have been expressed as valid 'questionable assumptions', they were awarded 1 mark each. Speculative criticisms of the use of surveys were not credited.

(b)   A few correct answers were given to this question, but most candidates appeared not to know what was meant by *confusion of necessary and sufficient conditions*, which is one of the flaws in reasoning identified and defined in the specification. They were therefore unable to give a coherent answer. Some candidates offered an answer to **Question 4(b)** which would have been correct for **Question 4(c)**: some of those repeated it in response to the next question and gained marks there, but others did not.

(c)   A fair number of candidates spotted the inconsistency between governments not being able to afford to pay for pensions or public works but hypothetically being able to provide UBI for all adults. Some wrongly identified an alleged inconsistency between the current situation, in which volunteers have become less available, and the hypothetical increased availability of volunteers which would occur under a system of UBI. Another popular wrong answer was that the opportunity for people to undertake voluntary work mentioned in paragraph 4 was inconsistent with the suggestion in paragraph 2 that they or others would do (some) paid work.

Question 5

Many candidates performed well on this question and some exceeded the requirements for full marks. Most made appropriate use of intermediate conclusions and other argument elements. Some answers were well-organised and presented in separate paragraphs, which suggests that those candidates may have benefited from the advice given in the question paper, to plan the answer before writing it; other answers could have been improved by following that advice. A few candidates argued both for and against the claim, instead of supporting **or** challenging it as they had been instructed to do. Some candidates discussed the topic of UBI, which was not precisely what they had been asked to do, but much of such discussion was relevant to the claim they were asked to discuss and so it was credited, unless it repeated ideas from the passage. A few candidates misunderstood the nature of this task and discussed the passage itself.

THINKING SKILLS

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Paper 9694/22
Critical Thinking
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Key messages

Although this exam tests skills more than knowledge, the specification does identify some subject knowledge which candidates are expected to know, and it is impossible to perform well without knowing such items as reliability criteria, the meanings of the expressions 'argument element' and 'unstated assumption' and the names of certain flaws and weaknesses in reasoning.

General comments

Because the June 2020 session was cancelled, this was the first time the new specification and the new format for the exam were tested.

Most candidates attempted the whole question paper. A few omitted part(s) of **Question 4**, which may have been through pressure of time (wisely giving priority to **Question 5**) or because they did not know how to attempt those questions.

The number of marks allocated to a question is normally a good guide as to the complexity of answer which is appropriate. Some candidates used up a lot of the time available to them in writing extensive answers to questions carrying only 1 or 2 marks. Conversely, some wrote short and undeveloped answers to **Question 2**, for which 8 marks were available.

Comments on specific questions

Section A

Topics for **Section A** may be drawn from any academic discipline. On this occasion, the subject area was environmental science. Many candidates appeared to be familiar with the subject matter of this section, and in **Question 2** some of them made more use of their existing knowledge than of the sources.

Question 1

(a)   Despite the mention of 'reliability' in both halves of this question, not many candidates appear to have realised that their answers should have referred to the five reliability criteria identified in the specification. Of those who did refer to reliability criteria, more candidates identified vested interest as an answer to **part (ii)** than expertise as an answer to **part (i)**. Most candidates sought to identify items from the source which increased or decreased its significance, which is not what they were asked to do. A popular wrong answer to **part (i)** was that the use of statistics increased the reliability of the source.

(b) (i)   A fair number of candidates correctly identified the conclusion of Source B as 'Working forests in the USA are not threatened by deforestation', but the most popular answer was 'Annual wood growth in the south-eastern USA increased by 112 per cent between 1956 and 2015.' A few other wrong answers were also given, while some candidates paraphrased the whole source instead of identifying its conclusion.

(ii)   There were several valid approaches to this question, of which the most popular was that the statistics are drawn from a time before the demand for wood pellets, which may have significantly increased the risk of deforestation. Some candidates were awarded 1 mark for pointing out that the statistics were somewhat out-dated without relating it to the new demand for wood pellets.

(c)   A significant number of candidates answered this question on the basis of the everyday meaning of the word 'argument', instead of its specialised sense used in Critical Thinking and this specification. In this case, the author of Source C does explicitly express disagreement with a widely held alternative opinion, but that is not what makes it an argument and answers along those lines were awarded 0 marks. Many candidates lost a mark by wrongly identifying the final sentence as the conclusion.

(d)   A fair number of candidates correctly identified the key point, namely that the new demand for wood pellets has significantly changed the potential value of forests which may previously have been immune from exploitation. Answers focusing on risk to rare flora and fauna were not credited, because that risk is not relevant to the change in potential commercial value.

(e)   Most candidates achieved at least 1 mark for this question. The most popular correct answers were that wood is cheaper, because other sources of renewable energy require expensive equipment, and that wood is more reliable than wind. Some candidates apparently did not understand that this question was asking them to think of some ideas for themselves and they answered it by quoting or paraphrasing from Source E: answers of this kind were not credited. Popular but incorrect answers were that wood is the most popular choice because trees can easily be replaced and that the replacement trees absorb CO_2: neither of those answers identifies an advantage by comparison with wind, sun or waves. A few candidates were awarded 0 marks for mistakenly contrasting wood burning with the use of coal, which is not a 'carbon neutral option'.

Question 2

Presumably because of prior knowledge of the topic, more candidates than usual did not refer explicitly to the sources. It was sometimes difficult to tell whether a comment was an implicit reference to one of the sources provided or derived from a candidate's prior knowledge. Although some credit is available for drawing on personal knowledge, making use of the sources provided is central to this task, and candidates should therefore try to make explicit use of all the sources in composing their answer. Some candidates interpreted the word 'combat' as if it meant 'solve', concluding, for example, that generating power by burning wood would not combat global warming but would make some contribution towards doing so. A few candidates lost marks by arguing both for and against the claim, without coming to a judgement. Many candidates emphasised the potential problems identified in Source C without taking into account that these problems were hypothetical, ('If the trees cut to supply wood are slow-growing hardwoods...').

Section B

The main problem experienced by candidates in **Question 4** and the latter part of **Question 3** seems to have been that they did not understand what they were being asked to do.

Question 3

(a)   The main conclusion of this argument was not very prominent, and very few candidates succeeded in identifying it. Nearly all of those who identified the correct part of the passage included the whole sentence, instead of restricting their answer to the second half, and were therefore awarded only 1 mark out of 2. The most popular answer was the last sentence of the passage. A significant number of candidates summarised the gist of the passage in their own words instead of attempting to identify the single clause which expressed the overall conclusion of the argument.

(b)   Most candidates correctly identified at least one intermediate conclusion, and a fair number achieved 6 marks out of 6. Every mark from 0 to 6 was instantiated.

(c)   A fair number of candidates clearly understood the nature of an 'unstated assumption' and were awarded 2 marks out of 2 for their answers, but – as in previous sessions – many others wrongly interpreted 'unstated assumption' as meaning 'unsupported statement'.

(d)   A few candidates gave the correct answer to this question and were awarded 1 or 2 marks, depending on how accurately they defined the function of the example in the reasoning. However, most candidates appeared not to understand the expression 'argument element' and gave a variety of answers which explained or discussed the words quoted without attempting to identify the argument element.

Question 4

(a) The inconsistency between paragraphs 1 and 2 was fundamental to the meaning of the respective paragraphs, and a fair proportion of candidates correctly identified it. Some expressed the inconsistency particularly neatly, by saying that whereas paragraph 1 says that adults who engage in risky activities need to grow up, paragraph 2 says that young adults use this kind of activity to prepare them for work, and thereby are growing up.

(b) A few candidates gained 1 mark for pointing out that – unlike excessive consumption of food and drink – high-risk sports confer health benefits to participants, but few if any gained the second mark by explaining that these benefits might save health services more money than the activities cost through injuries.

(c) (i) A fair number of candidates succeeded in identifying at least one side of the restriction of options and rightly pointed out that there may be other ways of relieving stress, apart from engaging in high-risk activities: they gained 1 or 2 marks. Some of those who understood the flaw applied it wrongly, claiming that some people may have other motives for engaging in high-risk leisure activities.

(ii) Even many of those candidates who had answered **part (i)** of this question correctly were unable to evaluate the effect of the flaw on the strength of the argument as a whole. Unsurprisingly, nearly all the candidates who had not identified the restriction of options correctly were also unable successfully to evaluate its effect.

Question 5

Many candidates performed well on this question and some exceeded the requirements for full marks. Most made appropriate use of intermediate conclusions and other argument elements. Some answers were well-organised and presented in separate paragraphs, which suggests that those candidates may have benefited from the advice given in the question paper, to plan the answer before writing it; other answers could have been improved by following that advice. A significant number of candidates were awarded very low marks because their answers consisted of a discussion or several independent statements referring to education or school in general (for example, arguing that school should be made enjoyable) without focussing on school being exciting and thereby did not support their conclusion. A few candidates argued both for and against the claim, instead of supporting **or** challenging it as they had been instructed to do.

THINKING SKILLS

Paper 9694/23 **Critical Thinking**

Key messages

Although this exam tests skills more than knowledge, the specification does identify some subject knowledge which candidates are expected to know, and it is impossible to perform well in the exam without knowing such items as reliability criteria, the meanings of the expressions 'argument element' and 'unstated assumption' and the names of certain flaws and weaknesses in reasoning.

General comments

Because the June 2020 session was cancelled, this was the first time the new specification and the new format for the exam were tested.

Most candidates attempted the whole question paper. A few omitted part(s) of **Question 4**, which may have been through pressure of time (wisely giving priority to **Question 5**) or because they did not know how to attempt those questions.

Comments on specific questions

Section A

Topics for **Section A** may be drawn from any academic discipline. On this occasion, the subject areas were geology and psychology. The topic of dowsing appeared to be unfamiliar to all or most candidates.

Question 1

(a)   Most candidates correctly stated that Source A was not an argument and correctly described its contents, but some achieved only 1 mark because they either omitted to mention that the passage does not include a persuasive conclusion or gave no indication of what the passage did contain.

(b)   Several valid comments based on the five reliability criteria were available, and many candidates correctly identified some of them, although relatively few managed to achieve full marks by offering valid comments on all four elements of the task. Some answers were not explicit enough, for example not giving any grounds for claiming that Richard Wiseman had a good reputation or saying he had good expertise without specifying in what relevant field such expertise lay. However, because only 1 mark was allocated to each answer, relatively undeveloped responses were acceptable. Candidates who accurately expressed the meaning of relevant reliability criteria without using the technical terminology received full credit.

(c) (i)   A fair number of candidates correctly suggested that the successful results could have been achieved by chance or luck, but fewer gained the second mark by pointing out that such a level of chance (3 out of 104) would be plausible. Some candidates made valid comments about the results, such as that the number of dowsers who achieved success was very low, but were awarded 0 marks because they did not offer an alternative explanation for the results, which is what the question asked them to do.

(ii)   A few candidates rightly suggested that the researchers' claim would be strengthened if the experiment were to be repeated and the same three participants were to achieve a similar 'high level of success'. A few other answers were awarded 1 mark, but there were several trivial answers, which were not credited, such as 'the qualifications of the researchers'.

(d) The 'usefulness' of a source involves both reliability and significance, since a source which is either unreliable or insignificant cannot be useful. Several comments about the reliability and significance were available, but many candidates were awarded 0 marks because they had summarised the contents of the source without evaluating its reliability or explaining its significance. Many candidates over-estimated the achievement of Source D, preferring verbs such as 'explains' or 'proves' rather than 'suggests' or 'claims'. Both in this question and in **Question 2**, many candidates did not realise that Source D was opposing dowsing and mistakenly inferred that successful dowsers have 'specialist knowledge of hydrology, geology and geophysics'.

Question 2

Performances on this question varied greatly. Most candidates put great weight on Source D and the views of Professor Wiseman in Source B and argued that dowsing is not a genuine skill. Nearly all answers were rightly focused on evaluating and making use of the sources provided. Many answers could probably have been improved if their authors had thought about them before beginning to write and given a persuasive structure to their answers, instead of (apparently) summarising each of the sources in turn and then attempting to come to a judgement.

Section B

Question 3

(a) A fair number of candidates correctly identified the main conclusion. However, the most popular answer was the last sentence of the first paragraph, presumably because of its location, since it is actually not even an intermediate conclusion. A few other wrong answers were also given.

(b) Many candidates – including some who had not succeeded in identifying the main conclusion – gained full marks on this question. A few lost marks by including additional argument elements in their answers, especially when the intermediate conclusion did not constitute the whole of a sentence.

(c) A few candidates correctly identified the quoted words as 'examples' and some of those gained the second mark by stating of what they were examples. Most, however, did not identify an argument element at all, but either summarised the section of the argument in their own words or argued against it. The most popular answer from those candidates who did offer an argument element was the implausible 'counter-assertion'.

(d) Many correct answers to this question were available, and a fair number of candidates correctly identified one of them. As on previous occasions, however, many candidates offered a quotation from the passage as an 'unstated assumption', which by definition could not have been correct.

Question 4

(a) Many candidates argued against the reasoning in this paragraph instead of explaining a weakness in it, but (as in **Question 3c** on the old exam format) comments of this kind were not credited. Some candidates gained 1 mark by pointing out that not all elderly people are incapable of thinking rationally, without identifying the unjustified transition from 'many people towards the end of their life' to everyone over a certain age. Credit was not given to answers which pointed out that some younger people lack the ability to think clearly, because that does not weaken the claim that old people lack the mental capacity for voting rationally.

(b) A fair number of candidates correctly identified the more significant of the instances of conflation in paragraph 3 (enjoying talking about the past conflated with living in the past), but not many succeeded in explaining the extent to which it weakened the reasoning. A few candidates gave the second, but less significant, correct answer, that grandparents were conflated with old people. A popular wrong answer was that enjoying talking about the past has been conflated with being unconfident about life in the present and the future, but that is an explicit step in the reasoning rather than conflation. Candidates who apparently did not know the meaning of the word *conflation* (which is listed and defined in the specification) offered various irrelevant answers.

(c)   Some candidates rightly criticised or challenged the untrue generalisation in paragraph 4 of the passage that pensioners do not contribute to the cost of running a country; however, claims that pensioners may contribute in other ways than financially were not credited, because they were simply counter-arguments, which did not identify a weakness in the reasoning. Very few identified the logical flaw in the reasoning, namely *denying the antecedent*, although a few were awarded 1 or 2 marks out of 2 for explaining the problem in simple terms, without reference to logic or use of technical vocabulary. A few candidates were awarded marks for criticising or challenging the false dichotomy between contributing financially and being 'dependent on the efforts and kindness of others'.

Question 5

Many candidates performed well on this question and some exceeded the requirements for full marks. Nearly everyone chose to support the claim, but a few challenged it. Most candidates made appropriate use of intermediate conclusions and other argument elements. Although hypothetical reasoning typically begins with the word 'if….', many candidates gave good instances of this argument element expressed as 'without elderly people….'.A few answers were well-organised and presented in separate paragraphs, which suggests that their authors may have benefited from the advice given in the question paper, to plan the answer before writing it; other answers could have been improved by following that advice. An unpersuasive line of reasoning offered by several candidates was that elderly people benefit doctors and nurses by keeping them employed. A few candidates offered arguments which were so remote from the stated claim that they received 0 marks, while a few others argued both for and against the claim, instead of supporting **or** challenging it as they had been instructed to do.

THINKING SKILLS

> **Paper 9694/31**
> **Problem Analysis and Solution**

Key messages

The question paper is not handed in for Paper 3; all working and answers need to be on the answer booklet in order to gain credit. Many candidates indicated that they had given the answers to some parts on the question paper.

General comments

As a result of the cancellation of the May/June series, this was the first paper using the new construction.

Most candidates gave a response to most parts of all questions.

Some candidates may be able to do two-mark questions in their heads, but should assume that for two or more marks they are being asked to do more than add or multiply two numbers.

Some candidates could make fewer errors and save time by ordering calculations more efficiently, e.g. calculating $a \times b \times (c + d)$ rather than $a \times (b \times c) + a \times (b \times d)$.

Explanations generally need to invoke specific detail, and not offer a generic observation that must be true.

Units often offer a valuable check on answers; a figure in dollars per tonne is not an area and cannot be the final answer to a question asking for the area.

Neither a blizzard of numbers nor an essay is needed in this paper; labelling numbers ensures partial credit can be given when deserved.

Candidates should check if their responses are realistic and plausible. For example, unrealistically high costs or speeds are unlikely to be correct; and a probability greater than 1 cannot be the right answer.

Some candidates set out space for answering all questions and then find that they are overflowing, sometimes making it unclear to which part they are responding.

Comments on specific questions

Question 1

Although hectares may not be a familiar unit to all, converting to square metres often resulted in errors.

(a)   Many candidates calculated 10 per cent of the total by taking 10 per cent of each part separately, and then worked with large totals rather than small differences.

(b)   This was simple and could be done by looking at the diagram for those who just considered the differences, but many turned it into a laborious process.

(c)   Most candidates answered this correctly, although a few made arithmetic errors.

(d)   Many candidates repeated the work already done in **(b)**, and a few offered an amount just above rather than just below the threshold that they had calculated.

(e)   Few candidates explicitly considered the largest percentage loss possible, which was needed to calculate the required threshold.

(f)   Many candidates gave answers that were not plausible: hedges long enough to go around the world, or measured in tonnes.

Question 2

This longer question was done first by many candidates.

(a)   Some candidates scored no marks because they had answered on the question paper. The table given had one value filled in on the second line, which offered a check for candidates that they had the first line correct. Those who had made an error and did not notice this check gained few marks in the subsequent parts.

(b)   Most candidates did this correctly.

(c)   The text explained that points were awarded based on the percentage vote; some candidates simply used the percentages as points.

(d)   Full marks required consideration of the new positions of B and H. Most handled B correctly but many did not check the revised position of H (or all those above).

(e)   Some candidates showed no working and may have lost two marks by only giving an incorrect final answer.

(f)   The explanation involved comparing the maximum of the lower group with the minimum of the upper one. Some candidates offered vague responses that would be true in cases where what was to be shown was the case, but did not relate to the specific context, e.g. '*They did not have enough points*'.

(g)   Most candidates gave the correct maximum but not minimum.

Question 3

Some candidates ignored one or more of the simple constraints, and so did not get full marks on any part. Those who also refrained from showing working would not have obtained any marks on this question.

(a) (i)   There are only two possible sets of values, but only one was required; some candidates unnecessarily gave both.

   (ii)   Many candidates incorrectly assumed that the first prize would also be as large as possible in this case.

(b)   Many unique wrong answers were given without working, which may indicate guesses.

(c)   Many candidates correctly determined the 3rd prize, but then did not make the differences as large as possible.

(d)   Few candidates took account of all the constraints.

Question 4

This questioned called for consideration of worst- or best-case options, with the service provider having to respond to customer choices.

(a)   Some candidates only considered change from $10 and not from $25, but most listed all the possibilities.

(b)   A few candidates added up all the cases instead of taking the maximum for each type.

(c)   Most candidates noted the need for two $10 notes, but fewer found the case where nine $1 notes were required.

(d)(i) Some candidates tackled a much simpler question – misconstruing '*whatever order they arrive*' as '*for some order of my choice*'.

(ii) Some candidates were reluctant to label numbers or identify calculations, and what they intended by underlining or arrows remains a mystery.

(e) Few candidates attempted the full task: to show both that their answer was possible in all cases, and that a higher one was not.

THINKING SKILLS

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Paper 9694/32
Problem Analysis and Solution
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Most candidates gave a response to most parts of all questions.

Some candidates may be able to do two-mark questions in their heads, but should assume that for two or more marks they are being asked to do more than add or multiply two numbers.

Some candidates could make fewer errors and save time by ordering calculations more efficiently, e.g. calculating $a \times b \times (c + d)$ rather than $a \times (b \times c) + a \times (b \times d)$.

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(d)   Full marks required consideration of the new positions of B and H. Most handled B correctly but many did not check the revised position of H (or all those above).

(e)   Some candidates showed no working and may have lost two marks by only giving an incorrect final answer.

(f)   The explanation involved comparing the maximum of the lower group with the minimum of the upper one. Some candidates offered vague responses that would be true in cases where what was to be shown was the case, but did not relate to the specific context, e.g. '*They did not have enough points*'.

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Question 3

Some candidates ignored one or more of the simple constraints, and so did not get full marks on any part. Those who also refrained from showing working would not have obtained any marks on this question.

(a) (i)   There are only two possible sets of values, but only one was required; some candidates unnecessarily gave both.

(ii)   Many candidates incorrectly assumed that the first prize would also be as large as possible in this case.

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THINKING SKILLS

> **Paper 9694/33**
> **Problem Analysis and Solution**

Key messages

The question paper is not handed in for Paper 3; all working and answers need to be on the answer booklet in order to gain credit. Many candidates indicated that they had given the answers to some parts on the question paper.

General comments

As a result of the cancellation of the May/June series, this was the first paper using the new construction.

Most candidates gave a response to most parts of all questions.

Some candidates may be able to do two-mark questions in their heads, but should assume that for two or more marks they are being asked to do more than add or multiply two numbers.

Some candidates could make fewer errors and save time by ordering calculations more efficiently, e.g. calculating $a \times b \times (c + d)$ rather than $a \times (b \times c) + a \times (b \times d)$.

Explanations generally need to invoke specific detail, and not offer a generic observation that must be true.

Units often offer a valuable check on answers; a figure in dollars per tonne is not an area and cannot be the final answer to a question asking for the area.

Neither a blizzard of numbers nor an essay is needed in this paper; labelling numbers ensures partial credit can be given when deserved.

Candidates should check if their responses are realistic and plausible. For example, unrealistically high costs or speeds are unlikely to be correct; and a probability greater than 1 cannot be the right answer.

Some candidates set out space for answering all questions and then find that they are overflowing, sometimes making it unclear to which part they are responding.

Comments on specific questions

Question 1

Although hectares may not be a familiar unit to all, converting to square metres often resulted in errors.

(a)   Many candidates calculated 10 per cent of the total by taking 10 per cent of each part separately, and then worked with large totals rather than small differences.

(b)   This was simple and could be done by looking at the diagram for those who just considered the differences, but many turned it into a laborious process.

(c)   Most candidates answered this correctly, although a few made arithmetic errors.

(d)   Many candidates repeated the work already done in **(b)**, and a few offered an amount just above rather than just below the threshold that they had calculated.

(e)   Few candidates explicitly considered the largest percentage loss possible, which was needed to calculate the required threshold.

(f)   Many candidates gave answers that were not plausible: hedges long enough to go around the world, or measured in tonnes.

Question 2

This longer question was done first by many candidates.

(a)   Some candidates scored no marks because they had answered on the question paper. The table given had one value filled in on the second line, which offered a check for candidates that they had the first line correct. Those who had made an error and did not notice this check gained few marks in the subsequent parts.

(b)   Most candidates did this correctly.

(c)   The text explained that points were awarded based on the percentage vote; some candidates simply used the percentages as points.

(d)   Full marks required consideration of the new positions of B and H. Most handled B correctly but many did not check the revised position of H (or all those above).

(e)   Some candidates showed no working and may have lost two marks by only giving an incorrect final answer.

(f)   The explanation involved comparing the maximum of the lower group with the minimum of the upper one. Some candidates offered vague responses that would be true in cases where what was to be shown was the case, but did not relate to the specific context, e.g. '*They did not have enough points*'.

(g)   Most candidates gave the correct maximum but not minimum.

Question 3

Some candidates ignored one or more of the simple constraints, and so did not get full marks on any part. Those who also refrained from showing working would not have obtained any marks on this question.

(a) (i)   There are only two possible sets of values, but only one was required; some candidates unnecessarily gave both.

   (ii)   Many candidates incorrectly assumed that the first prize would also be as large as possible in this case.

(b)   Many unique wrong answers were given without working, which may indicate guesses.

(c)   Many candidates correctly determined the 3rd prize, but then did not make the differences as large as possible.

(d)   Few candidates took account of all the constraints.

Question 4

This questioned called for consideration of worst- or best-case options, with the service provider having to respond to customer choices.

(a)   Some candidates only considered change from $10 and not from $25, but most listed all the possibilities.

(b)   A few candidates added up all the cases instead of taking the maximum for each type.

(c)   Most candidates noted the need for two $10 notes, but fewer found the case where nine $1 notes were required.

(d)(i) Some candidates tackled a much simpler question – misconstruing '*whatever order they arrive*' as '*for some order of my choice*'.

(ii) Some candidates were reluctant to label numbers or identify calculations, and what they intended by underlining or arrows remains a mystery.

(e) Few candidates attempted the full task: to show both that their answer was possible in all cases, and that a higher one was not.

THINKING SKILLS

| Paper 9694/41 |
| Applied Reasoning |

Key messages

* In **Question 1**, many candidates struggled to gain any marks.
* in **Question 2** most candidates did as they were asked and attempted to evaluate the reasoning, but few achieved very many marks.
* In **Question 3**, candidates gained marks in **part (a)** more often than in **part (b)**.
* In **Question 4**, many candidates created their own argument structure, ignoring the sequence in which the documents are presented, but few engaged *critically* with the documents provided.

General comments

All candidates appeared to have enough time to finish the paper – none appeared to have run out of time. The extra time appears to have allowed candidates to finish their answers to **Question 4**. Candidates did less well on the questions**, 1(b)** and **2(b)**, that were different in format from the legacy syllabus.

The standard of candidates varied greatly but there was evidence that some candidates had been well prepared.

Comments on specific questions

Question 1

Overall, **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 available for analysis. As ever, some candidates were unaware that quoting from the text is an appropriate, indeed a required, way to answer this question.

(a) Only around half of responses correctly spotted the main conclusion; still fewer achieved a mark, because many paraphrased or included supporting material in their answer.

(b) Many candidates did not know what was required of this new style of analysis question, suggesting that few had studied the specimen paper. Candidates were required to identify (by stating) parts of the paragraph as individual argument elements and, for full credit, to describe the relationships between each of the elements that had been identified. Some responses summarised the meaning of the paragraph, evaluated it or attempted to counter the reasoning. Of those candidates who attempted analysis, many paraphrased, many neglected to name the elements and many neglected to describe relationships between elements. It was relatively common to award 1 mark for identifying the conclusion, and well-prepared candidates often achieved 2, but the award of more than 2 marks was rare. No candidate identified an unstated assumption as part of their analysis.

(c) Candidates were more successful at this part of the question, perhaps because it more closely resembled the format of the question on the legacy paper. For candidates who understood the task, it was common to award 2 marks, usually for the first and final IC in the mark scheme. Candidates appeared reluctant to offer any of the 'out of context' ICs as an answer, often offering the principle in paragraph 5 instead. Most candidates followed the instruction to give only three answers.

Question 2

Most candidates were aware of the nature of the task and attempted an evaluation. Historically, very few candidates have been able to identify assumptions, indeed many appear not to have learned that an assumption must not be stated in the text. However, on this occasion assumption marks were regularly credited in both parts of the question. 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'.

(a) Many candidates scored 0, but well-prepared candidates were able to gain full marks. Evaluative points that regularly gained credit included reliance on two questionable assumptions: that people would not want to look at images of people who are unidentifiable and that these security checks will guarantee that people will reach their destination safely. Other points that gained credit were the reliance on the unsupported principle, the *ad hominem*, the straw man, and the appeal to popularity.

(b) This style of question was also different from the legacy paper, but candidates did at least seem to understand what was required. Many responses identified weaknesses along the lines of those suggested in the mark scheme; most of these gained only 1 mark as few were able to link their identification of a weakness to impact on the argument as a whole, although most did try.

Question 3

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

(a) Candidates were presented with a graph and asked to make some criticisms of the way in which the data had been presented. The full range of scores, from 0 to 3, was awarded, although 3 was relatively uncommon. Most commonly, candidates gained marks for reference the absence of a scale on the y-axis, followed by the irregular intervals on the x-axis. All other points on the mark scheme were seen, apart from reference to the possibility of a logarithmic scale and, surprisingly, reference to the possibility that any costs might not have been adjusted for inflation. Common uncreditworthy responses included the graph not covering 40 years and that the results not being up to date – the former is not correct, and the latter is not a problem with the presentation. Unlike in previous sessions, few candidates criticised the credibility of the evidence.

(b) The most common correct response was that the question did not match the claim. Credit was also given regularly for questioning the public representativeness of a telephone poll, the question being unclear to respondents and there being no facility for respondents to communicate strength of opinion. Common uncreditworthy responses referred to the unknown sample size, the potential for lying or rushed answers in a telephone poll or a hypothetical polling company bias. Generic responses like these are rarely credited, and the information given in the document that the poll was conducted by a reputable polling company ought to have steered candidates away from such responses. Many candidates appeared to think that the poll was invalid if the respondents were not regular fliers, missing the significance of the term 'public opinion'.

Question 4

Candidates were required to use the documents to construct a reasoned case to support or challenge the conclusion that we should reduce security checking at airports. 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. Many candidates were able to arrange their ideas into strands of reasoning that supported intermediate conclusions. Hence, marks for the structure and quality skills often exceeded Level 1. Few candidates were using the documents with a critical eye, which meant the marks for 'use of documents' were often restricted to Level 1. Candidates who achieved highly were able to deal effectively key positions that were counter to the candidate's main conclusion. Arguments supporting the conclusion were strengthened by effectively responding to potential objections about safety; those challenging the conclusion were strengthened if they included effective responses to objections about cost. It is worth reminding centres that what is likely to get high marks is a persuasive argument with a clear structure that is supported by thoughtful, particularly critical, use of the documents and that thoughtfully considers relevant alternative viewpoints.

THINKING SKILLS

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Paper 9694/42
Applied Reasoning
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(b) This style of question was also different from the legacy paper, but candidates did at least seem to understand what was required. Many responses identified weaknesses along the lines of those suggested in the mark scheme; most of these gained only 1 mark as few were able to link their identification of a weakness to impact on the argument as a whole, although most did try.

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