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 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.

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

When units are used in the stem of a question, these are usually the most appropriate for the candidate to use in their solution. However, candidates may choose to use different units, but if they do so, they must make this clear in their answer. For example, if a question uses hours, and the answer to a question is 3 hours, full marks will be awarded for the answer 3, with or without 'hours'. An answer of 180 minutes will also be awarded full marks, but an answer of 180 will not.

General comments

In general, the candidates engaged well with the paper. Most candidates offered good responses to at least some of the questions on the paper. It was pleasing to see that when candidates were not able to solve earlier questions on the paper, they persevered and often earned marks in the later questions. As always, candidates are advised to read the questions carefully and take note of each piece of information. It is particularly important to remember that the initial stem of a question applies to the whole of the question.

Comments on specific questions

Question 1

Most candidates scored full marks on this question by calculating the difference between the two times of arrival at the office. The remaining candidates usually calculated one of these times correctly and were awarded partial credit.

Question 2

This question proved to be challenging for most candidates.

(a) A correct solution involved the realisation that cutting a block into four pieces required only three cuts. The common misconception was that four cuts were required, leading to an answer of 160 seconds instead of 150 seconds.

(b) The same misconception in this part leads to a time for cutting the block of 390 seconds instead of 400 seconds. The difference between this and the time required in **part (a)** is the same with the incorrect times as the correct times and credit was given to candidates who worked consistently in

the two parts. However, most candidates gave 400 seconds as their answer, ignoring the fact that the question asks for the increase in the time.

Question 3

(a) 75 per cent of the candidates scored full marks on this part by finding the maximum possible income from three screenings at $9 each and two screenings at $15 each. The most common error was to include the screening that begins at 16:10 in the '18:00 or later' category.

(b) This part was much less well done than **part (a)**. Very few candidates used the easiest method of solution, namely finding the total time for four screenings as four times of 125 minutes plus three gaps of 20 minutes, making 560 minutes or 9 hours 20 minutes. This length of time can then be used to work backwards from the end time of 22:30. Most candidates opted for the method of creating a schedule of the start and end times of each screening, working backwards from 22:30. More often than not this led to arithmetical errors. Other errors were to give an answer of 12:50, subtracting an extra 20 minutes at the start, or 15:15, the end time of the first screening. Candidates should ensure that they read the request in the question carefully, before they decide on their final answer, particularly after they have been involved in a calculation.

Question 4

Candidates engaged well with this question, but there was a sense that more would have obtained the correct answers if they had drawn clear careful diagrams to help them follow the path of the robotic cart more accurately.

(a) 60 per cent of the candidates were able to deduce that the cart ended up facing West.

(b) About 30 per cent of the candidates were able to give a set of two instructions that would move the cart back to its original start position. The question asked for the fewest number of possible moves. Some candidates gave a long list of instructions but were able to gain partial credit if the first of their instructions was correct.

Question 5

This question proved challenging. Most candidates gave answers to the two parts of this question, but only 20 per cent were correct. Almost all possible combinations of two colours were seen in **part (a)** and almost every year between 1962 and 2000 was seen in **part (b)**. A clearly-expressed solution to either part was rare.

Question 6

(a) Most candidates made a good attempt at this part, with 50 per cent of candidates giving the correct answer of 100 cats and another 20 per cent of candidates earning partial credit. The method was clearly known, but various inaccuracies crept into solutions. Some candidates omitted Milly's lunch break. Other candidates confused the working days and hours of Milly and Donny.

The most concise approach is to work out that Milly makes 3 cats an hour and works 7 hours a day for 4 days, so makes 84 cats per week. Donny makes 2 cats an hour and works 4 hours a day for 2 days, so makes 16 cats per week. Many candidates opted for a scheduling approach, which although helpful to some extent in **part (b)** was not necessary in this part, and led to errors.

(b) Most candidates embarked on a scheduling approach and about 40 per cent were successful. The common error was to only consider Milly.

(c) Just under half of the candidates correctly calculated that Milly could make 16 giraffes in a day, taking account of the lunch break and the restriction imposed by that. Some candidates only found the number of giraffes made by Milly before lunch.

(d) This was a challenging final part to the question. The key to solving the problem is to realise that the most efficient use of time is for Milly to start her lunch break immediately after she finishes making a giraffe. There are three possible times at which Milly could start her lunch break and the single mark available required all three possibilities. Although only a small percentage of candidates found all three times, about one-third were able to give either one or two of these times.

Question 7

This question was answered correctly by almost half of the candidates whilst a significant minority of candidates made little or no attempt, presumably not understanding how to make any progress.

(a) The key to this part is to realise that the points scored for PAINT and PLANT enable the value for L to be found. Since vowels are worth 1 point, the letters PANT score 14 points (1 less than the score for PAINT). Then since PLANT scores 19 points, L must be worth 19 – 14 = 5 points.

(b) It can be deduced from STONE being worth 11 points that STN is worth 9 points. The value for D can then be deduced from the value for STAND less STN and the vowel A.

(c) From the score for CURRY (14 points) and the fact that the minimum value of any letter is 2, it can be deduced that the value of RR must be no more than 9. Hence, if R is an integer it is worth 4 points, otherwise 4.5 points.

Question 8

Although most candidates attempted this question, only 20 per cent made any meaningful progress.

Many candidates attempted trials, adding different amounts in the hope that after five weeks they would get to the same amount for both Tamsin and Caroline. For success in this approach, it is necessary to realise that the amounts that Tamsin and Caroline receive each week must differ by \$30/5 = \$6. Without this insight, a trial method is unlikely to bear fruit.

Question 9

Many candidates made good attempts at answering this question. A minority of candidates thought that levels 31–60 was only 29 levels, not 30 and this had an impact on their calculations.

(a) This is a 'show that' question and candidates need to show their working in order to be awarded the mark. The minimum acceptable working was 120 + 180 + 270 = 570. Some candidates had the numbers 120, 180 and 270 scattered in the working space, but gave no indication that these numbers needed to be added together. A minority of candidates gave an addition of three completely different numbers, claiming quire erroneously that their sum was 570.

(b) To find the greatest amount of time taken to complete every level of the game, the extreme situation needs to be considered. The player needs to take the maximum number of attempts and the maximum time allowed at each level. Using this information, many candidates were then able to achieve the correct answer by multiplying their result by 30. Some candidates did not multiply by 30 and gave the answer 2450 minutes and were awarded partial credit. A common error was not to consider the maximum number of attempts.

(c) The most popular approach to this part was to use scheduling, but because of the complexity involved, it rarely led to the correct answer. The most efficient method of solution is to take an overview of the problem. The minimum playing time is $(5 + 8 + 12) \times 30 = 750$ minutes. Rahim plays the game for 2 hours (or 120 minutes) per day, so he will finish the game in 6 days and 30 minutes. This gives a finishing time of 19:30 on Sunday (Day 7).

After solving a problem such as this, candidates would be well-advised to think about the feasibility of their answer. Rahim only plays between 19:00 and 21:00, so answers such as 02:30 are not possible.

(d) A pleasing number of candidates were able to give one correct combination of numbers of Medium and Hard levels, and a minority gave a further two or three correct combinations. There was some evidence that some candidates thought they had answered the question when they had found one combination. The question is worth 3 marks and perhaps that might indicate to candidates that there are 3 answers in this type of search question.

Question 10

(a) The question states that the boat leaves the landing stage at 10:15 and then at regular 90-minute intervals. This means it leaves at 10:15, 11:45, 13:15, 14:45, 16:15 and 17:45. However, many candidates misinterpreted the information and decided that the 90-minute interval only started after the boat had returned from its 50-minute trip. Perhaps they should have been alerted to a problem when their answer for the time when the boat returned from its last trip of the day was close to midnight, or even in the early hours of the following morning.

(b) Sightings of the correct answer to this part were quite rare, but the majority of candidates were able to give one of the suboptimal answers for partial credit.

Question 11

This question proved to be challenging and 40 per cent of the candidates omitted it entirely.

(a) Just over 20 per cent of the candidates answered this part correctly. By running 1 km the astronaut uses 20 litres of oxygen, leaving 30 litres for her walking. She consumes 1 litre per minute when walking, so she will be able to walk for 30 minutes, giving an arrival time of 09:56.

(b) Just 8 per cent of candidates were successful in this part. The method of solution is similar to that in **part (a)** but candidates seemed to find it more difficult with the walking and running elements reversed.

(c) Most candidates did not make any attempt at this part and very few of those who did were successful.

Question 12

There were some excellent solutions to this question, but most candidates either omitted it or attempted to write out all the possible combinations with increasing numbers of toppings. This latter approach was rarely successful. A common incorrect answer was 51, indicating little understanding of the problem, since 31 toppings is the greatest number of toppings that are needed for a different one on each of 31 days.

Question 13

It was pleasing to see that the majority of candidates attempted this final question on the paper, even though some had omitted the previous two or three questions.

(a) This part was generally attempted well. The most common incorrect answers were 1/3 and 3/7.

(b) Those candidates who answered **part (a)** correctly almost always answered this part correctly as well. The most common incorrect answers were 1/3 and 2/7.

(c) About half of the candidates attempted this part and many were able to score at least one of the two marks, usually with the example that **(iii)** must be true. Very few realised that the example of **(ii)** being false was a possibility. These brief statements were all that was required, but some candidates showed excellent understanding of the problem as they went on to explain the consequences of their choices of examples.

THINKING SKILLS

Paper 9694/12
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 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.

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

When units are used in the stem of a question, these are usually the most appropriate for the candidate to use in their solution. However, candidates may choose to use different units, but if they do so, they must make this clear in their answer. For example, if a question uses hours, and the answer to a question is 3 hours, full marks will be awarded for the answer 3, with or without 'hours'. An answer of 180 minutes will also be awarded full marks, but an answer of 180 will not.

General comments

In general candidates engaged very well with the paper. 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) Almost all candidates gave the correct answer to this part. The most common wrong answer was $12.10.

(b) Almost all candidates gave the correct answer of 6 to this part, often showing the value 6.875 in their working. A small number of candidates wrongly gave the answer as 7.

Question 2

(a) This part was usually answered correctly.

(b) This part proved a little more difficult than **part (a)**, with 07:45 being a fairly common wrong answer.

Question 3

Most candidates, though not all, correctly identified that Cecily should read the books with 270, 324 and 418 pages. Almost all of them added these numbers together and divided by 40 to get 25.3, which most correctly rounded up to 26. While some candidates went on to give the correct latest date, a considerable number wrongly gave the answer as September 4th.

Question 4

(a) This question was answered well, although not all candidates found all three possible combinations.

(b) Quite a lot of candidates missed the information that Helen bought five bowls and gave one of the combinations as 7 yellow bowls. Some others gave answers involving 6 bowls.

(c) Almost all the candidates gave the correct answer to this part, with some also stating that this was made up of 1 green bowl and 7 yellow bowls.

Question 5

(a) Most candidates gave the correct answer here although a small number forgot about the 2-minute gap between events and gave the wrong answer of 7.4 minutes.

(b) This part was done well, with a few candidates making arithmetic errors and some forgetting the 2-minute gaps between events.

(c) This part was answered correctly by most candidates. The answer of 85.1 minutes, when a candidate has not included the 2-minute gaps between events, was also credited here, but only in cases where the candidate had made the same error in **part (a)** and given that answer as 7.4 minutes.

(d) Most candidates gained full credit for the correct answer here. A small number of candidates made arithmetic errors which resulted in them giving the wrong competitor or wrong point score as the answer, but were allowed partial credit if they showed James scored 19 points in their working.

Question 6

This question was answered very well, with some candidates not only giving all five possible 4-digit PINs but also giving them in either ascending or descending order. Some candidates omitted one or more of the possible PINs, and some gave one or more incorrect value.

Question 7

There were many correct answers to this question. There were also quite a number of answers where candidates gained partial credit for showing the partially obscured values 127 and 106, or for working out that the distance between the signposts was 21 km, but did not arrive at the correct final answer. There were other answers which showed little or no understanding of the question.

Question 8

(a) Most candidates showed that Toni would complete 270 invitations and Kevin 180 invitations, and almost all added those together correctly.

(b)(i) Most candidates misinterpreted this question by assuming that Toni wrote each invitation in 25 seconds and then Kevin put it in an envelope in 20 seconds, so that each additional invitation took 45 seconds to produce. They then worked out $180 \times 60 \div 45$ to give an incorrect answer of 240 invitations. Only a small minority of candidates realised that the number of invitations produced is largely governed by Toni, who can write $180 \times 60 \div 25 = 432$ invitations. Even fewer candidates then realised that the correct answer to this part is 431 invitations, because Kevin does not have time to put the last invitation written by Toni into an envelope.

(ii) In this part, credit was given for answers correctly working out Kevin's waiting time when the answer to **part (b)(i)** was 431 invitations. Candidates with an answer of 432 in **part (b)(i)** were allowed follow through credit for an answer of 2160 seconds, or 36 minutes.

Question 9

(a) This part was done correctly by most candidates, although some candidates did not complete the grid by writing the points scored in the right squares on the grid, and a few did not add the 12-point bonus for a complete row.

(b) There were many correct answers, but also quite a few cases where candidates thought 4 bonus lines could be made, and others where candidates thought only 2 bonus lines could be made.

(c) This was found quite difficult, with some candidates putting the final five scores in the correct squares on the grid, though not always in the correct order, some putting the five scores in wrong squares and some not attempting this part.

(d) Some candidates gave the correct answer of 24 points, with many of those giving a correct explanation why no bonus points could be scored. This was usually on the lines of 'you need 1s and 2s to find four numbers that add up to 12' or 'you can make 12 from 3 + 4 + 5 – but that is only three numbers'. Some candidates thought that either one or two rows qualifying for bonus points could be made and gave an incorrect total score. Some candidates did not attempt this part.

Question 10

(a) In order to do this part correctly, candidates had to realise that the smallest number of days would occur when Peter chooses chocolate-covered cereal every morning. The calculation $750 \div 60$ gives 12.5 days, and most candidates showing this correctly rounded down to 12 days. There were a lot of completely wrong answers for this part.

(b) In this part the situation is different, as Peter must choose his cereal so that the two boxes, one of each type, last as long as possible. Only a few of candidates realised that there are a total of 58 servings in the two boxes, which will last for 19 days. Only some of these candidates realised that there are 33 servings of sugar-covered cereal in the 1000 g box and Karl will eat 19 of those, meaning that the maximum number of times Peter could have sugar-covered cereal is 14. A common wrong answer here was 16 times, coming from $1000 \div 60$.

Question 11

(a) The main difficulty with this part was to realise that the 50 per cent discount was allowed on 3 of the yellow books and the 20 per cent discount was allowed on the other 2. Quite a lot of candidates gained only partial credit because of that, though quite a lot gained full marks.

(b) Many candidates realised that the lowest amount would be when the most expensive combination of 3 books (coded yellow, green, red) occurred twice, with the yellow, green, blue code combination occurring once. These candidates usually went on to gain full marks for ending up with the optimum answer of \$80. Some candidates gained 2 marks for suboptimal answers involving three different groups of three different colour coded books. Other candidates gained 1 mark for stating the optimal combination but neglecting to show that the cost was \$80, or for a suboptimal answer of \$86.60, which has two lots of three books and three lots of two books.

Question 12

(a) This part proved very challenging, with most candidates either omitting it or making no progress towards a solution. The smallest area for the original D34 occurs when both D34f and the final D34 have areas of 14 km^2, and the other icebergs, D34a, D34b, D34c, D34d and D34e each have areas of 10 km^2; very few candidates worked this out correctly.

(b) Very few candidates realised that this part also depends on using the fact that the other icebergs involved, D42a and D42b must have areas of 10 km^2 for D42c to have its largest possible area of 113 km^2. Very few correct answers were seen, and only a very small number of candidates gained partial credit for mentioning 226 km^2, which is the maximum area of the resulting D42 and D42c combined.

Question 13

(a) Only a minority of candidates realised that the maximum number of people that could attend the conference is determined by the maximum of the group sizes for Session B – which is 130. Some candidates omitted this part

(b) This part was often omitted. A small number of candidates realised that, since the total of the capacities of the talks is 620, the theoretical maximum is a quarter of this – 155. Only a very small number of candidates refined their answer to 150 to take account of all the maximum group sizes being multiples of 10. A few answers consisting of a schedule for a revised plan for the conference were seen.

THINKING SKILLS

Paper 9694/13
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 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.

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

When units are used in the stem of a question, these are usually the most appropriate for the candidate to use in their solution. However, candidates may choose to use different units, but if they do so, they must make this clear in their answer. For example, if a question uses hours, and the answer to a question is 3 hours, full marks will be awarded for the answer 3, with or without 'hours'. An answer of 180 minutes will also be awarded full marks, but an answer of 180 will not.

General comments

In general candidates engaged very well with the paper. 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) Almost all candidates gave the correct answer to this part. The most common wrong answer was $12.10.

(b) Almost all candidates gave the correct answer of 6 to this part, often showing the value 6.875 in their working. A small number of candidates wrongly gave the answer as 7.

Question 2

(a) This part was usually answered correctly.

(b) This part proved a little more difficult than **part (a)**, with 07:45 being a fairly common wrong answer.

Question 3

Most candidates, though not all, correctly identified that Cecily should read the books with 270, 324 and 418 pages. Almost all of them added these numbers together and divided by 40 to get 25.3, which most correctly rounded up to 26. While some candidates went on to give the correct latest date, a considerable number wrongly gave the answer as September 4th.

Question 4

(a) This question was answered well, although not all candidates found all three possible combinations.

(b) Quite a lot of candidates missed the information that Helen bought five bowls and gave one of the combinations as 7 yellow bowls. Some others gave answers involving 6 bowls.

(c) Almost all the candidates gave the correct answer to this part, with some also stating that this was made up of 1 green bowl and 7 yellow bowls.

Question 5

(a) Most candidates gave the correct answer here although a small number forgot about the 2-minute gap between events and gave the wrong answer of 7.4 minutes.

(b) This part was done well, with a few candidates making arithmetic errors and some forgetting the 2-minute gaps between events.

(c) This part was answered correctly by most candidates. The answer of 85.1 minutes, when a candidate has not included the 2-minute gaps between events, was also credited here, but only in cases where the candidate had made the same error in **part (a)** and given that answer as 7.4 minutes.

(d) Most candidates gained full credit for the correct answer here. A small number of candidates made arithmetic errors which resulted in them giving the wrong competitor or wrong point score as the answer, but were allowed partial credit if they showed James scored 19 points in their working.

Question 6

This question was answered very well, with some candidates not only giving all five possible 4-digit PINs but also giving them in either ascending or descending order. Some candidates omitted one or more of the possible PINs, and some gave one or more incorrect value.

Question 7

There were many correct answers to this question. There were also quite a number of answers where candidates gained partial credit for showing the partially obscured values 127 and 106, or for working out that the distance between the signposts was 21 km, but did not arrive at the correct final answer. There were other answers which showed little or no understanding of the question.

Question 8

(a) Most candidates showed that Toni would complete 270 invitations and Kevin 180 invitations, and almost all added those together correctly.

(b)(i) Most candidates misinterpreted this question by assuming that Toni wrote each invitation in 25 seconds and then Kevin put it in an envelope in 20 seconds, so that each additional invitation took 45 seconds to produce. They then worked out $180 \times 60 \div 45$ to give an incorrect answer of 240 invitations. Only a small minority of candidates realised that the number of invitations produced is largely governed by Toni, who can write $180 \times 60 \div 25 = 432$ invitations. Even fewer candidates then realised that the correct answer to this part is 431 invitations, because Kevin does not have time to put the last invitation written by Toni into an envelope.

(ii) In this part, credit was given for answers correctly working out Kevin's waiting time when the answer to **part (b)(i)** was 431 invitations. Candidates with an answer of 432 in **part (b)(i)** were allowed follow through credit for an answer of 2160 seconds, or 36 minutes.

Question 9

(a) This part was done correctly by most candidates, although some candidates did not complete the grid by writing the points scored in the right squares on the grid, and a few did not add the 12-point bonus for a complete row.

(b) There were many correct answers, but also quite a few cases where candidates thought 4 bonus lines could be made, and others where candidates thought only 2 bonus lines could be made.

(c) This was found quite difficult, with some candidates putting the final five scores in the correct squares on the grid, though not always in the correct order, some putting the five scores in wrong squares and some not attempting this part.

(d) Some candidates gave the correct answer of 24 points, with many of those giving a correct explanation why no bonus points could be scored. This was usually on the lines of 'you need 1s and 2s to find four numbers that add up to 12' or 'you can make 12 from 3 + 4 + 5 – but that is only three numbers'. Some candidates thought that either one or two rows qualifying for bonus points could be made and gave an incorrect total score. Some candidates did not attempt this part.

Question 10

(a) In order to do this part correctly, candidates had to realise that the smallest number of days would occur when Peter chooses chocolate-covered cereal every morning. The calculation $750 \div 60$ gives 12.5 days, and most candidates showing this correctly rounded down to 12 days. There were a lot of completely wrong answers for this part.

(b) In this part the situation is different, as Peter must choose his cereal so that the two boxes, one of each type, last as long as possible. Only a few of candidates realised that there are a total of 58 servings in the two boxes, which will last for 19 days. Only some of these candidates realised that there are 33 servings of sugar-covered cereal in the 1000 g box and Karl will eat 19 of those, meaning that the maximum number of times Peter could have sugar-covered cereal is 14. A common wrong answer here was 16 times, coming from $1000 \div 60$.

Question 11

(a) The main difficulty with this part was to realise that the 50 per cent discount was allowed on 3 of the yellow books and the 20 per cent discount was allowed on the other 2. Quite a lot of candidates gained only partial credit because of that, though quite a lot gained full marks.

(b) Many candidates realised that the lowest amount would be when the most expensive combination of 3 books (coded yellow, green, red) occurred twice, with the yellow, green, blue code combination occurring once. These candidates usually went on to gain full marks for ending up with the optimum answer of \$80. Some candidates gained 2 marks for suboptimal answers involving three different groups of three different colour coded books. Other candidates gained 1 mark for stating the optimal combination but neglecting to show that the cost was \$80, or for a suboptimal answer of \$86.60, which has two lots of three books and three lots of two books.

Question 12

(a) This part proved very challenging, with most candidates either omitting it or making no progress towards a solution. The smallest area for the original D34 occurs when both D34f and the final D34 have areas of 14 km^2, and the other icebergs, D34a, D34b, D34c, D34d and D34e each have areas of 10 km^2; very few candidates worked this out correctly.

(b) Very few candidates realised that this part also depends on using the fact that the other icebergs involved, D42a and D42b must have areas of 10 km^2 for D42c to have its largest possible area of 113 km^2. Very few correct answers were seen, and only a very small number of candidates gained partial credit for mentioning 226 km^2, which is the maximum area of the resulting D42 and D42c combined.

Question 13

(a) Only a minority of candidates realised that the maximum number of people that could attend the conference is determined by the maximum of the group sizes for Session B – which is 130. Some candidates omitted this part

(b) This part was often omitted. A small number of candidates realised that, since the total of the capacities of the talks is 620, the theoretical maximum is a quarter of this – 155. Only a very small number of candidates refined their answer to 150 to take account of all the maximum group sizes being multiples of 10. A few answers consisting of a schedule for a revised plan for the conference were seen.

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, candidates are expected to have studied the specification, preferably with the aid of the endorsed textbook and with reference to previous question papers and mark schemes. The exam takes it for granted that candidates will know such items as reliability criteria, the specialised meaning of the terms 'argument', 'argument element', 'assumption' and 'analogy', and the names of certain flaws and weaknesses in reasoning.

Candidates should understand that instances of correct evaluation in their answers to parts of **Question 1** may be used to gain credit in their answer to **Question 2** (if used appropriately).

Candidates need to understand the differences between **Questions 2** and **5**. **Question 2** asks candidates to what extent they agree with a claim, so they may give a nuanced conclusion. **Question 5** asks them to write an argument to support **or** challenge a claim, so they must aim to persuade the reader to agree with their chosen side. Giving a counter-position and dismissing it with reason may strengthen their argument, but if it is not dismissed then it weakens the candidate's own argument. Answers to **Question 2** may be expressed as an opinion, e.g., 'I agree…,' but answers to **Question 5** should consist of either the conclusion provided in the question or its direct opposite. In **Question 2**, candidates are expected to engage with the sources provided, whereas the content of answers to **Question 5** should be entirely their own ideas and be neither derived from nor in dialogue with the passage used as the basis for **Questions 3** and **4**.

General comments

There was a wide range of performance on this occasion. A few candidates gave impressive answers to most of the questions, while many made more or less successful attempts at them. As in previous sessions, however, many candidates appeared not to know what they were supposed to do.

The handwriting of a significant proportion of candidates was difficult to decipher. Although markers did their best to interpret what lay before them, they could not necessarily guarantee to have given full credit to answers which they had misread.

A significant minority of candidates omitted one or more questions, most probably because they did not know how to answer them.

Several candidates answered the questions in an apparently haphazard order. They are free to do this if they wish, and they are under no obligation to take into consideration the convenience of markers. Candidates who give at least an undeveloped answer to **Question 5** before attempting **Question 4** if they are in danger of running out of time are making a wise choice. However, it would seem unwise to answer **Question 2** before **Question 1** and it must be difficult to hold parts A and B of the exam in one's mind simultaneously. Answering questions out of order also makes it too easy to omit a question unintentionally or to record question numbers or parts incorrectly.

The questions which were done least well were **Question 1(c)** and **Question 4(d)**, both of which were good examples of ways in which Critical Thinking skills can impinge on real life. In each case, candidates needed to read the relevant sources carefully, in order to see precisely what they were claiming. This is what many writers and speakers hope readers and audiences will not do.

Comments on specific questions

Section A

Most candidates engaged well with the topic of Part A.

Question 1

(a) Most candidates correctly judged that Source C was not an argument and many rightly supported this judgment by referring to the absence of a persuasive conclusion and briefly describing what the passage was doing. However, many omitted one element of a full answer and were awarded only 1 mark out of 2. Some candidates achieved 0 marks, despite having made a correct judgment, because they neither identified the crucial missing element of an argument nor found a way of expressing what the source was doing. A few candidates made wrong judgments, while others made statements which appeared to be based on a wrong understanding of the word 'argument', for example, that Source C was not an argument because it expressed only one side, or did not include a rebuttal. Several candidates stated incorrectly that the essential ingredients of an argument are 'claim, counter-argument and conclusion'.

(b) Answers expected to this question were based on the five Reliability criteria identified in the specification. More candidates than on previous occasions seemed to know what this question required them to do, although some appeared not to know what was expected, and suggested how the source could have been improved (especially by introducing statistics) or discussed their own opinions about its subject-matter. Several valid answers based on the Reliability criteria were available. Many candidates made poor judgments, such as that the blog was weakened by its vested interest to promote child welfare (whereas this in fact strengthened its reliability), or because blogs have a poor reputation since they are of unknown origin (whereas this blog originated from a campaign group). Some candidates judged wrongly that expertise in neurosurgery is irrelevant to assessing the risk of brain damage involved in playing contact sports. Some answers were too vague and unsupported to be credited.

(c) This question asked candidates to identify a weakness in the reasoning, but many attempted different tasks, such as evaluating the reliability of the evidence, suggesting how the source could have been improved, (e.g., by giving more information about risks or by including statistical evidence), or by arguing against the source. No credit was given to answers which attempted the wrong task. Only a few candidates spotted the conflation between contact sports and team sports. Some candidates claimed that the neurosurgeon had illegitimately generalised on the basis of two sports, but this was not accurate, since his comments were based on 'sports **like** hockey and football'.

(d) All three of the answers on the mark scheme occurred fairly often, but many candidates achieved 1 mark rather than 2, by not explaining their answers fully. Some candidates gave halves of two answers, but only one was credited, because they had been asked to give one answer. A few candidates wrongly answered this question on the basis of reliability criteria, but answers of this kind were not credited.

(e) By far the most popular answer was that the CTE might have been caused by something other than playing football, but very few candidates gained the second mark, by suggesting that the other cause was something to which football players might be especially liable, such as excessive consumption of alcohol or reckless driving. All the other answers on the mark scheme were offered in whole or in part by several candidates. A few candidates suggested that the players might have had a genetic predisposition to developing CTE, but this was not credited, because there was no obvious reason why people with such a predisposition should be particularly likely to play American football. Similarly, old age was not a valid alternative explanation for the development of CTE, since it did not explain why former football players should be at greater risk of developing this disease than the general population. Several candidates suggested that the symptoms of CTE could be caused by other illnesses, overlooking the fact that in this case the diagnosis was made by studying the brains of deceased players rather than on the basis of symptoms. Another fairly popular wrong approach interpreted the expression 'believed to be' as meaning that the cause of CTE is unknown. Some candidates claimed wrongly that if playing American football had been the cause of their having CTE, all the players would have suffered from it, rather than most of them.

Question 2

Significant numbers of candidates supported the claim provided, opposed it or took intermediate positions. A few conclusions were not coherent enough to be credited, such as 'I do not agree to an extent that children should not be allowed to play contact sports.'

Some candidates evidently changed their minds while writing their answers, going back to the beginning to insert or delete the word "not" into or from their conclusion, sometimes more than once. It would have been better if they had spent a short time planning their answer before beginning to write it.

Many candidates achieved low marks for extended answers, mainly because they quoted at length from the sources, which must take up quite a lot of time. It is better to summarise sources briefly and draw inherences from them.

Some candidates drew on sources without identifying them. This is a slightly risky strategy, because it relies on the marker's recognising the references. It is advisable to name the sources being used.

The key to achieving higher marks in tasks of this kind is to evaluate sources and draw pertinent inferences from them, and on this occasion a good proportion of candidates attempted to do this, with varying degrees of success. As on previous occasions, however, 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.

Some evaluation of sources was too perfunctory to be credited. There are no marks to gain by simply saying something along the lines of 'Source X has reputation, expertise and vested interest'. Rather than trying to apply all or most of the criteria to a given source, candidates would be better to choose one and to develop it properly – either the one that they think is most applicable or, if necessary, the one they think themselves best able to explain properly. In this context, it is worth pointing out that only one reliability evaluation can be credited per source, so there is nothing to be gained by a bulk attribution of the criteria to each source.

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 playing sports. However, some candidates relied entirely on their own thinking, making no use of the sources, which was contrary to the stated intention of the task and therefore severely limited the mark they could achieve.

Section B

Although candidates understood the general thrust of the passage provided, some of them seemed to have difficulty understanding how 'domestic cleaners and computer engineers' might come across confidential information in the course of their work. This may have been because they did not realise that 'domestic' referred to private homes.

Question 3

A few candidates wasted time by explaining their answers to **Question 3**, in addition to quoting the relevant part of the passage, but the latter was all that they were required to do.

Some candidates created ambiguity in answers to **Question 3**, by using ellipses, brackets and underlining, possibly in the hope that markers would interpret the ambiguity in their favour. On the contrary, these practices were interpreted as unfair practice and no benefit of the doubt was given.

(a) Many candidates gave the correct answer to this question (the first sentence of paragraph 5), but a few candidates reduced their mark by adding the following sentence to their answer. The first sentence of paragraph 2 was a popular wrong answer and other wrong answers were also offered, including all or part of the first sentence of the argument. A few candidates appeared not to understand the question and gave a précis of the reasoning instead of identifying its main conclusion.

(b) Most candidates seemed to know what they were looking for, and a significant minority gave two correct answers. A few candidates quoted the whole of the second sentence in paragraph 3, which included two additional elements in addition to the correct answer and therefore, according to the mark scheme, scored 0. The first sentence of paragraph 4 was a very popular wrong answer: although this statement is in a prominent position, and therefore may superficially resemble an

intermediate conclusion, it introduces the example and intermediate conclusion which follow, rather than being supported by them, and so anyone who understood the nature of an intermediate conclusion should not have mistaken this sentence for one of them. A few candidates gave answers which were so implausible as to suggest that they might not know what an intermediate conclusion is.

(c) A fair number of candidates achieved one or both marks for this question, but there were some wrong answers, especially 'example'. Some candidates gained the second mark despite having identified the argument element incorrectly. Many candidates apparently did not know what the expression 'argument element' meant (although it frequently occurs in this position in the exam) and therefore quoted or paraphrased the sentence or paragraph or identified an alleged flaw in its reasoning instead of identifying an argument element and explaining its function. Some candidates appear to have misinterpreted the phrase 'the following words' to refer to the words following the ones quoted, instead of the actual words reproduced in the question.

(d) A few candidates succeeded in identifying one of the three unstated assumptions available, but – as on previous occasions – many quoted from the passage or paraphrased its content, apparently not realising that answers of those kinds cannot constitute 'unstated' assumptions. Other incorrect answers were aspects of the implied situation (especially that domestic cleaners and computer engineers are likely to come across confidential information in their work) or implications of the reasoning, rather than a missing step within it.

Question 4

(a) Many candidates correctly identified the example of Personal Attack in paragraph 6, but many offered wrong answers, particularly the manager in paragraph 5, the counsellor in paragraph 4 and the main conclusion (because it includes the word 'foolish').

(b) Many candidates correctly named the flaw as a slippery slope and identified both the small beginning and the alleged extreme adverse consequences, but far fewer gained the third mark by explaining why these consequences were unlikely to occur. A few candidates identified the flaw incorrectly, e.g., as rash generalisation, or made a general criticism, such as lack of evidence: these answers were not credited.

(c) Most candidates gained one mark by correctly identifying the analogy. Relatively few attempted to evaluate the analogy, even though that was what the question asked them to do. As on previous occasions, simply pointing out that the scenarios being compared were different was insufficient as an evaluation, because in an analogy the two entities being compared are always different. Those candidates who attempted an evaluation of the analogy tended to over-estimate its validity. Very few candidates focused on the narrowly defined circumstances and constraints under which a counsellor may need to infringe confidentiality, which was what the analogy claimed to be illustrating. Some candidates took it for granted that the 'counsellor' referred to in paragraph 4 was a school counsellor.

(d) In order to answer this question correctly, candidates needed to notice precisely what the author was claiming. Some did so, but most wrongly judged that this single example supported well the claim that people who have promised to maintain confidentiality 'often' find a way to avoid doing so. Others over-stated the claim, referring to 'always' or 'everyone'. Some candidates criticised the example for being anonymous, which was not a relevant weakness.

Question 5

As demonstrated in the published example 8–mark answers in every session, answers to **Question 5** do not need to be very lengthy in order to achieve full marks. Two strands of reasoning, each including two reasons and one or two argument elements and each leading to an intermediate conclusion, are sufficient. The best answers came from candidates who had evidently spent time thinking about their answers before setting pen to paper, which is the recommended strategy for this question.

Nearly all candidates chose to support the claim. Opposing it was quite difficult: for example, the fact that some people betray trust does not support a conclusion that people do not need a friend they can trust.

Many candidates argued for or against their own variation on the claim supplied to them, instead of doing exactly what they had been asked to do. These included, 'Everyone should have a friend they can trust,'

'Everyone needs at least one friend they can trust' and 'In life you will always need people around you that you can trust.' Some of these variations were deemed to be insignificant, while others were not credited. Candidates should reason in support of either precisely the claim supplied in the question paper or a straightforward contradiction of that claim.

A fair number of candidates gained full marks on this question. Many answers were well structured, in separate strands of reasoning, and many candidates made appropriate use of 'additional argument elements' (examples, evidence, analogies, counters with response or hypothetical reasoning). This topic was particularly suitable for the use of personal testimony, and many candidates strengthened their arguments in this way. Some referred relevantly to the broad results of relevant psychological research, but those who claimed to remember specific data were generally not believed. Although some candidates constructed their strands of reasoning to support intermediate conclusions, relatively few used argument indicator words to identify those intermediate conclusions.

An increased number of candidates made use of apparently fictitious evidence to support their answers. Reasoning of this kind is not rewarded. Although of course candidates are unlikely to have access to relevant evidence under exam conditions, supporting an argument by use of fake evidence is not a skill to be encouraged.

Some candidates explained why they agreed or disagreed with the claim, using expressions such as 'I agree that….' or 'I support the claim.' These words did not constitute the conclusion of an argument, and answers of this kind did not fulfil the requirements of the set task. Many low-scoring answers consisted of a single stream of consciousness, not necessarily divided into separate sentences; others were brief and undeveloped, while some were vague, trite and repetitive. A few candidates offered opinions on the subject which were not used to support any conclusion and therefore did not qualify as reasons.

Most candidates emphasised the role of trusted friends in keeping secrets, and some seemed to take it for granted that the topic had no other aspects. This was probably under the influence of the argument which was the basis of **Question 3** and **4**. Parts of some answers were explicitly based on the argument provided and (as stated in the rubric for the question) were therefore ignored for the purpose of marking.

THINKING SKILLS

Paper 9694/22
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, candidates are expected to have studied the specification, preferably with the aid of the endorsed textbook and with reference to previous question papers and mark schemes. The exam takes it for granted that candidates will know such items as reliability criteria, the specialised meaning of the terms 'argument', 'argument element', 'assumption' and 'analogy', and the names of certain flaws and weaknesses in reasoning.

Candidates should understand that instances of correct evaluation in their answers to parts of **Question 1** may be used to gain credit in their answer to **Question 2** (if used appropriately).

Candidates need to understand the differences between **Questions 2** and **5**. **Question 2** asks candidates to what extent they agree with a claim, so they may give a nuanced conclusion. **Question 5** asks them to write an argument to support **or** challenge a claim, so they must aim to persuade the reader to agree with their chosen side. Giving a counter-position and dismissing it with reason may strengthen their argument, but if it is not dismissed then it weakens the candidate's own argument. Answers to **Question 2** may be expressed as an opinion, e.g., 'I agree…,' but answers to **Question 5** should consist of either the conclusion provided in the question or its direct opposite. In **Question 2**, candidates are expected to engage with the sources provided, whereas the content of answers to **Question 5** should be entirely their own ideas and be neither derived from nor in dialogue with the passage used as the basis for **Questions 3** and **4**.

General comments

Most candidates attempted to answer all the questions. Where questions were omitted, this was sometimes when candidates had written a great deal in the earlier parts of the paper, suggesting that they had simply run out of time to complete it.

Candidates often answered questions in an order different from that on the question paper. When doing so, they usually answered all the questions, but a minority omitted questions with no sign that this was deliberate. Perhaps they would have tried to answer the missing questions had they realised that they had left them unanswered. It is important to check that all questions have been attempted.

Comments on specific questions

Section A

Question 1

(a) Most candidates correctly judged that Source B was an argument. A significant proportion of these responses correctly identified the main conclusion and explained that it was supported by the preceding material in the source. Excluding those responses that judged Source B not to be an argument, the most common wrong answer was to identify the conclusion as being 'the installation and maintenance of these stoves is an environmentally responsible activity'.

(b) The function of a 'national advisory body' was not always correctly understood. Some candidates seemed to believe that it was involved directly in the sale and installation of wood-burning stoves. They were not penalised for this.

Where candidates had identified relevant reliability criteria, but did not gain many marks, this was nearly always because they did not focus precisely on how a given criterion was applied. For example, to get the 'expertise' point, it was necessary to state the nature of the expertise – in this paper, it was expertise on the subject of (installing) solid fuel and biomass heating. Unqualified attribution of expertise to the author of Source B was insufficient for credit.

(c) Few candidates managed to achieve full marks for this question, but a large proportion did score two marks for making one of the points on the mark scheme, usually one of the first two. Such candidates often obtained a third mark by making part of one of the other points.

Popular wrong answers often claimed that Source A was being inconsistent by seemingly advocating (in paragraph 3) the use of wood-burning stoves, not noticing that this was specifically restricted to 'households without another source of heating'.

Some candidates tried to use material from Source B – and, more rarely, Source C – to highlight weaknesses in Source A for the given claim, but this was not what the question had asked them to do.

(d) There was only one inconsistency to be identified between Sources A and C – the contrast between modern wood-burners' emission of PM2.5 particles being 'too high' (Source A) and being 'acceptable' (Source C). A fair number of candidates identified both elements, although a significant number only identified one element, not quite stating the other precisely enough for credit, thereby gaining a single mark. Others identified features of the two sources that appeared to, but did not in fact, constitute an inconsistency.

(e) In general, this question was well answered. Most candidates recognised the relevance of Source D to Source E's demand that wood-burning stoves should be banned.

When commenting on the fact that some people are only able to heat their houses by burning wood, a number of candidates claimed that Source D stated that this restriction was because these people could not afford to do otherwise. Source D neither stated this nor implied it. Presumably, this was a factor read into the text by candidates – not an unreasonable one, perhaps, although geographical location is undoubtedly relevant also. Similarly, some candidates claimed that Source D judged the health problems caused by living in an inadequately heated house to be worse than those caused by PM2.5 pollution. Again, the source neither stated nor implied this. These readings provide a useful illustration of the care that needs to be taken to ensure a clear and accurate grasp of what a source contains, either explicitly or implicitly, and what it does not contain.

Question 2

Very few candidates argued in favour of an outright ban on wood-burning stoves. A large majority were in favour either of no ban or of a qualified ban, taking into account the implications that an outright ban would have for the health of those people who have no other source of heating.

There was some very good use made of the sources, with Source C being the one least used. Hardly any candidates relied solely on personal thinking – a practice that restricts the total marks available for the question. A few candidates confined themselves to evaluating the sources, making little or no use of them.

It was clear that most candidates were familiar with the reliability criteria, although too many tried to apply these in an unfocused manner. There are no marks to gain by simply saying something along the lines of 'Source X has reputation, expertise and vested interest'. Rather than trying to apply all or most of the criteria to a given source, candidates would be better to choose one and to develop it properly – either the one that they think is most applicable or, if necessary, the one they think themselves best able to explain properly. In this context, it is worth pointing out that only one reliability evaluation can be credited per source, so there is nothing to be gained by a bulk attribution of the criteria to each source.

There were three marks available for valid inferential reasoning from the sources. Two examples of creditworthy inferential reasoning were often seen. Firstly, it was inferred (from Sources B and C) that if a ban on wood-burning stoves were to be imposed, it would be unlikely to make much difference to the amount

of PM2.5 in the environment. Secondly, it was inferred (from Source D) that if a ban were to be imposed, it would cause undue hardship to those people who did not have access to another source of domestic heating. Another type of inferential reasoning often seen was by candidates who drew logical connections between different sources, although even candidates who had answered **Question 1(d)** correctly rarely referred to the inconsistency between Sources A and C that they had already identified.

There was little personal thinking seen, possibly because the subject matter of Section A did not easily lend itself to this, but one good example seen in several scripts pointed out that people who had to rely on burning wood to keep their houses warm could mitigate the effects of a ban by dressing more warmly.

Section B

Question 3

(a) This was answered rather less well than usual. There were various wrong answers seen. An abridged version of the first sentence of paragraph 1 and the last sentence of paragraph 4 were two common ones. Some candidates identified the correct main conclusion, but included the counter-assertion that preceded it, thereby earning only a single mark.

(b) This question was answered very well. The most commonly seen correct answers were the first and third listed in the mark scheme. Some candidates could only be awarded a single mark, because they presented the first and second intermediate conclusions together as a single one, and likewise with the third and fourth. It is highly unlikely ever to be the case that an intermediate conclusion (or a main conclusion) will straddle two sentences. So, the presence of a full stop in a proposed answer should be an indicator to a candidate that they may have added unnecessary material.

The most common reason for failing to obtain marks was for identifying intermediate conclusions other than in paragraphs 2 and 3. The final sentences of paragraphs 1 and 4 were often seen. These were indeed intermediate conclusions, but located outside the scope of the question.

(c) The counter-assertion listed second in the mark scheme was the more frequently seen of the two. The most common wrong answer was the final sentence of paragraph 2 – the response to the second counter-assertion. Perhaps candidates were misled by this sentence beginning with ‘However…’. Counter-assertions or counter-arguments often begin with this word or one like it, but it can also herald a response to a counter, as it did in this instance.

A few responses suggested that the candidates did not understand what a counter-assertion is.

(d) There were six unstated assumptions available to candidates for identification. Versions of all of these were seen, with the first and third being the most common. Few candidates made the mistake of quoting from the passage.

Question 4

(a) This question was generally answered well. Candidates were able to explain that although reference had been made to genealogy being ‘an increasingly popular leisure activity’, this was not being used to persuade candidates that it is a worthwhile activity; instead, persuasion was by outlining the benefits of the activity for brain function.

(b) Many candidates obtained credit for this question. The most popular ways of doing this were by identifying and explaining the conflation between feeling ‘less lonely’ and having ‘better mental health’, or by making the single-mark point stating that loneliness is unlikely to be reduced by making new discoveries about family members. Some candidates did recognise that there was a rash generalisation present, but did not manage to explain it well enough for a second mark.

Some candidates stated that there was a slippery slope present, beginning with genealogical activities and ending with improved mental health. No credit was given for such responses.

(c) Many candidates obtained full marks for this question, identifying the analogy and explaining that it was not being used in support of the argument in paragraph 1, but instead was either elucidating the nature of genealogy or making it seem more attractive and interesting.

Where full credit was not obtained, this was usually because candidates had stated that the analogy supported the reasoning in the paragraph very well. Although supporting reasoning is a common function of analogies, it was not the case here, as most candidates recognised.

(d) The most commonly seen way of obtaining full credit was by making the first two points on the mark scheme. Where only a single mark was awarded, this was usually for making the final point on the mark scheme, recognising that a researcher may be unable to predict what might discomfit or embarrass relatives.

Some people misunderstood the question, indicating that the phrase 'This may be true, but…' indicated only a partial response.

(e) A good number of candidates recognised the flaw as being a personal attack (*ad hominem*), although they were not always able to explain the key point – that opponents were merely being insulted, instead of their views being considered and rebutted. Such responses only received a single mark.

Various incorrect answers were seen, the most common of which was the claim that the flaw of straw man was present. Some candidates suggested that an unwarranted general claim was being made about amateur genealogists. Others confined themselves to stating that even professional genealogists might be upset by such 'unexpected findings', thereby simply denying the claims made in the *ad hominem*. A few candidates claimed that the fallacy of No True Scotsman had been committed.

Question 5

Responses were approximately 3:2 in favour of challenging the claim given. Very few candidates tried to argue for equal importance between relationships with friends and those with family members.

Other than a few glancing references to genealogy, there was almost no reference to the passage.

Many candidates produced well-structured and carefully argued reasoning to challenge or support the given claim. Unusually for **Question 5** arguments, many of the reasons used in support of the question's claim also worked well for challenging the claim; that is, they were equally applicable to friends or family. Statements such as, 'your friends know you better than your family', or 'your family is better placed than your friends to give you advice and guidance in difficult situations' were often seen reversed in responses.

The topic perhaps encouraged candidates to give quite personalised answers, citing good examples from their own lives that illustrated well the points they were trying to make.

It would be helpful for candidates to state clearly the conclusion for which they are arguing at either the start or the end of their arguments; indeed, there is no reason why this cannot be done at both ends. In some responses, the conclusion was found in the middle of the argument, sometimes halfway through a paragraph. These occasionally conveyed the impression that the candidate had started writing the argument before deciding whether to support or to challenge the claim. However, in many scripts there was evidence of clear and effective planning having taken place before constructing the argument. It is always worth taking a few minutes to collect one's thoughts and to sketch out the structure of the proposed argument.

Most candidates made use of at least two separate strands of reasoning. It is always good if new strands are started in a new paragraph. Simply heralding them by a word such as 'furthermore' makes it less likely that a candidate's intention to start a new strand will be detected by the examiner.

Candidates cannot obtain full marks for this question unless they include at least one intermediate conclusion in their arguments. Ideally, these would be accompanied by suitable indicator words, although this does not often happen. While the use of such indicator words does not guarantee that intended intermediate conclusions can be credited as such, their use makes it clear to an examiner what the candidate's intention is. Apart from their function in the exam, appropriate use of argument indicator words helps when constructing longer, more complex arguments in higher education and beyond, when it is imperative that readers understand how a piece of reasoning is structured.

As outlined in the key messages at the beginning of this report, candidates need to be aware of the difference between **Question 2** and **Question 5**. The relevance of this distinction here is that marks for **Question 5** are capped at six unless a candidate gives the conclusion as stated in the question. Some very good responses were capped for this reason, usually because the conclusion had been prefaced with a statement such as 'I believe that…'.

THINKING SKILLS

Paper 9694/23
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, candidates are expected to have studied the specification, preferably with the aid of the endorsed textbook and with reference to previous question papers and mark schemes. The exam takes it for granted that candidates will know such items as reliability criteria, the specialised meaning of the terms 'argument', 'argument element', 'assumption' and 'analogy', and the names of certain flaws and weaknesses in reasoning.

Candidates should understand that instances of correct evaluation in their answers to parts of **Question 1** may be used to gain credit in their answer to **Question 2** (if used appropriately).

Candidates need to understand the differences between **Questions 2** and **5**. **Question 2** asks candidates to what extent they agree with a claim, so they may give a nuanced conclusion. **Question 5** asks them to write an argument to support **or** challenge a claim, so they must aim to persuade the reader to agree with their chosen side. Giving a counter-position and dismissing it with reason may strengthen their argument, but if it is not dismissed then it weakens the candidate's own argument. Answers to **Question 2** may be expressed as an opinion, e.g., 'I agree…,' but answers to **Question 5** should consist of either the conclusion provided in the question or its direct opposite. In **Question 2**, candidates are expected to engage with the sources provided, whereas the content of answers to **Question 5** should be entirely their own ideas and be neither derived from nor in dialogue with the passage used as the basis for **Questions 3** and **4**.

General comments

Most candidates attempted to answer all the questions. Where questions were omitted, this was sometimes when candidates had written a great deal in the earlier parts of the paper, suggesting that they had simply run out of time to complete it.

Candidates often answered questions in an order different from that on the question paper. When doing so, they usually answered all the questions, but a minority omitted questions with no sign that this was deliberate. Perhaps they would have tried to answer the missing questions had they realised that they had left them unanswered. It is important to check that all questions have been attempted.

Comments on specific questions

Section A

Question 1

(a) Most candidates correctly judged that Source B was an argument. A significant proportion of these responses correctly identified the main conclusion and explained that it was supported by the preceding material in the source. Excluding those responses that judged Source B not to be an argument, the most common wrong answer was to identify the conclusion as being 'the installation and maintenance of these stoves is an environmentally responsible activity'.

(b) The function of a 'national advisory body' was not always correctly understood. Some candidates seemed to believe that it was involved directly in the sale and installation of wood-burning stoves. They were not penalised for this.

Where candidates had identified relevant reliability criteria, but did not gain many marks, this was nearly always because they did not focus precisely on how a given criterion was applied. For example, to get the 'expertise' point, it was necessary to state the nature of the expertise – in this paper, it was expertise on the subject of (installing) solid fuel and biomass heating. Unqualified attribution of expertise to the author of Source B was insufficient for credit.

(c) Few candidates managed to achieve full marks for this question, but a large proportion did score two marks for making one of the points on the mark scheme, usually one of the first two. Such candidates often obtained a third mark by making part of one of the other points.

Popular wrong answers often claimed that Source A was being inconsistent by seemingly advocating (in paragraph 3) the use of wood-burning stoves, not noticing that this was specifically restricted to 'households without another source of heating'.

Some candidates tried to use material from Source B – and, more rarely, Source C – to highlight weaknesses in Source A for the given claim, but this was not what the question had asked them to do.

(d) There was only one inconsistency to be identified between Sources A and C – the contrast between modern wood-burners' emission of PM2.5 particles being 'too high' (Source A) and being 'acceptable' (Source C). A fair number of candidates identified both elements, although a significant number only identified one element, not quite stating the other precisely enough for credit, thereby gaining a single mark. Others identified features of the two sources that appeared to, but did not in fact, constitute an inconsistency.

(e) In general, this question was well answered. Most candidates recognised the relevance of Source D to Source E's demand that wood-burning stoves should be banned.

When commenting on the fact that some people are only able to heat their houses by burning wood, a number of candidates claimed that Source D stated that this restriction was because these people could not afford to do otherwise. Source D neither stated this nor implied it. Presumably, this was a factor read into the text by candidates – not an unreasonable one, perhaps, although geographical location is undoubtedly relevant also. Similarly, some candidates claimed that Source D judged the health problems caused by living in an inadequately heated house to be worse than those caused by PM2.5 pollution. Again, the source neither stated nor implied this. These readings provide a useful illustration of the care that needs to be taken to ensure a clear and accurate grasp of what a source contains, either explicitly or implicitly, and what it does not contain.

Question 2

Very few candidates argued in favour of an outright ban on wood-burning stoves. A large majority were in favour either of no ban or of a qualified ban, taking into account the implications that an outright ban would have for the health of those people who have no other source of heating.

There was some very good use made of the sources, with Source C being the one least used. Hardly any candidates relied solely on personal thinking – a practice that restricts the total marks available for the question. A few candidates confined themselves to evaluating the sources, making little or no use of them.

It was clear that most candidates were familiar with the reliability criteria, although too many tried to apply these in an unfocused manner. There are no marks to gain by simply saying something along the lines of 'Source X has reputation, expertise and vested interest'. Rather than trying to apply all or most of the criteria to a given source, candidates would be better to choose one and to develop it properly – either the one that they think is most applicable or, if necessary, the one they think themselves best able to explain properly. In this context, it is worth pointing out that only one reliability evaluation can be credited per source, so there is nothing to be gained by a bulk attribution of the criteria to each source.

There were three marks available for valid inferential reasoning from the sources. Two examples of creditworthy inferential reasoning were often seen. Firstly, it was inferred (from Sources B and C) that if a ban on wood-burning stoves were to be imposed, it would be unlikely to make much difference to the amount

of PM2.5 in the environment. Secondly, it was inferred (from Source D) that if a ban were to be imposed, it would cause undue hardship to those people who did not have access to another source of domestic heating. Another type of inferential reasoning often seen was by candidates who drew logical connections between different sources, although even candidates who had answered **Question 1(d)** correctly rarely referred to the inconsistency between Sources A and C that they had already identified.

There was little personal thinking seen, possibly because the subject matter of Section A did not easily lend itself to this, but one good example seen in several scripts pointed out that people who had to rely on burning wood to keep their houses warm could mitigate the effects of a ban by dressing more warmly.

Section B

Question 3

(a) This was answered rather less well than usual. There were various wrong answers seen. An abridged version of the first sentence of paragraph 1 and the last sentence of paragraph 4 were two common ones. Some candidates identified the correct main conclusion, but included the counter-assertion that preceded it, thereby earning only a single mark.

(b) This question was answered very well. The most commonly seen correct answers were the first and third listed in the mark scheme. Some candidates could only be awarded a single mark, because they presented the first and second intermediate conclusions together as a single one, and likewise with the third and fourth. It is highly unlikely ever to be the case that an intermediate conclusion (or a main conclusion) will straddle two sentences. So, the presence of a full stop in a proposed answer should be an indicator to a candidate that they may have added unnecessary material.

The most common reason for failing to obtain marks was for identifying intermediate conclusions other than in paragraphs 2 and 3. The final sentences of paragraphs 1 and 4 were often seen. These were indeed intermediate conclusions, but located outside the scope of the question.

(c) The counter-assertion listed second in the mark scheme was the more frequently seen of the two. The most common wrong answer was the final sentence of paragraph 2 – the response to the second counter-assertion. Perhaps candidates were misled by this sentence beginning with ‘However…’. Counter-assertions or counter-arguments often begin with this word or one like it, but it can also herald a response to a counter, as it did in this instance.

A few responses suggested that the candidates did not understand what a counter-assertion is.

(d) There were six unstated assumptions available to candidates for identification. Versions of all of these were seen, with the first and third being the most common. Few candidates made the mistake of quoting from the passage.

Question 4

(a) This question was generally answered well. Candidates were able to explain that although reference had been made to genealogy being ‘an increasingly popular leisure activity’, this was not being used to persuade candidates that it is a worthwhile activity; instead, persuasion was by outlining the benefits of the activity for brain function.

(b) Many candidates obtained credit for this question. The most popular ways of doing this were by identifying and explaining the conflation between feeling ‘less lonely’ and having ‘better mental health’, or by making the single-mark point stating that loneliness is unlikely to be reduced by making new discoveries about family members. Some candidates did recognise that there was a rash generalisation present, but did not manage to explain it well enough for a second mark.

Some candidates stated that there was a slippery slope present, beginning with genealogical activities and ending with improved mental health. No credit was given for such responses.

(c) Many candidates obtained full marks for this question, identifying the analogy and explaining that it was not being used in support of the argument in paragraph 1, but instead was either elucidating the nature of genealogy or making it seem more attractive and interesting.

Where full credit was not obtained, this was usually because candidates had stated that the analogy supported the reasoning in the paragraph very well. Although supporting reasoning is a common function of analogies, it was not the case here, as most candidates recognised.

(d) The most commonly seen way of obtaining full credit was by making the first two points on the mark scheme. Where only a single mark was awarded, this was usually for making the final point on the mark scheme, recognising that a researcher may be unable to predict what might discomfit or embarrass relatives.

Some people misunderstood the question, indicating that the phrase 'This may be true, but…' indicated only a partial response.

(e) A good number of candidates recognised the flaw as being a personal attack (*ad hominem*), although they were not always able to explain the key point – that opponents were merely being insulted, instead of their views being considered and rebutted. Such responses only received a single mark.

Various incorrect answers were seen, the most common of which was the claim that the flaw of straw man was present. Some candidates suggested that an unwarranted general claim was being made about amateur genealogists. Others confined themselves to stating that even professional genealogists might be upset by such 'unexpected findings', thereby simply denying the claims made in the *ad hominem*. A few candidates claimed that the fallacy of No True Scotsman had been committed.

Question 5

Responses were approximately 3:2 in favour of challenging the claim given. Very few candidates tried to argue for equal importance between relationships with friends and those with family members.

Other than a few glancing references to genealogy, there was almost no reference to the passage.

Many candidates produced well-structured and carefully argued reasoning to challenge or support the given claim. Unusually for **Question 5** arguments, many of the reasons used in support of the question's claim also worked well for challenging the claim; that is, they were equally applicable to friends or family. Statements such as, 'your friends know you better than your family', or 'your family is better placed than your friends to give you advice and guidance in difficult situations' were often seen reversed in responses.

The topic perhaps encouraged candidates to give quite personalised answers, citing good examples from their own lives that illustrated well the points they were trying to make.

It would be helpful for candidates to state clearly the conclusion for which they are arguing at either the start or the end of their arguments; indeed, there is no reason why this cannot be done at both ends. In some responses, the conclusion was found in the middle of the argument, sometimes halfway through a paragraph. These occasionally conveyed the impression that the candidate had started writing the argument before deciding whether to support or to challenge the claim. However, in many scripts there was evidence of clear and effective planning having taken place before constructing the argument. It is always worth taking a few minutes to collect one's thoughts and to sketch out the structure of the proposed argument.

Most candidates made use of at least two separate strands of reasoning. It is always good if new strands are started in a new paragraph. Simply heralding them by a word such as 'furthermore' makes it less likely that a candidate's intention to start a new strand will be detected by the examiner.

Candidates cannot obtain full marks for this question unless they include at least one intermediate conclusion in their arguments. Ideally, these would be accompanied by suitable indicator words, although this does not often happen. While the use of such indicator words does not guarantee that intended intermediate conclusions can be credited as such, their use makes it clear to an examiner what the candidate's intention is. Apart from their function in the exam, appropriate use of argument indicator words helps when constructing longer, more complex arguments in higher education and beyond, when it is imperative that readers understand how a piece of reasoning is structured.

As outlined in the key messages at the beginning of this report, candidates need to be aware of the difference between **Question 2** and **Question 5**. The relevance of this distinction here is that marks for **Question 5** are capped at six unless a candidate gives the conclusion as stated in the question. Some very good responses were capped for this reason, usually because the conclusion had been prefaced with a statement such as 'I believe that…'.

THINKING SKILLS

Paper 9694/31
Problem Analysis and Solution

Key messages

The title of this paper is 'Problem Analysis and Solution', not just solution, and it is even more important than in Paper 1 to show working and communicate reasoning.

Candidates should show **all** their working in their answer booklet, not just their final answers.

When a response is a sentence or paragraph there is no need to underline it, especially when the quality of handwriting makes it difficult to distinguish underlined from crossed-out.

Candidates should be encouraged to check that their final answer is an answer to the question posed, and that any quantities are plausible in the context, with the digits written without ambiguity.

When logical deduction is called for, correct responses will not use words such as 'likely'.

Not all questions involve numbers, but understanding whether a number represents a discrete quantity or a rounded value is important.

General comments

Most candidates attempted most parts of all questions. A few still offer only the final answer without working, even in 'show that' questions when the answer is given.

Few candidates spotted systematic approaches that were available instead of laboriously trying as many of the possibilities that they could think of.

Some candidates appeared not to have done even the most basic checks on their work: does this response answer the question posed, and will it be clear to the marker what justifies giving credit?

Comments on specific questions

Question 1

Almost all candidates responded to this question, not always as their first one.

(a) Two thirds of candidates gave the correct time, but a few offered 'the 5th day' or similar.

(b) Many candidates gave the correct price, but few listed the correct days.

(c) Some candidates gave the correct price, but very few listed the correct days to start watching.

(d) Most candidates identified that the total time available was exactly the time required, but many did not then check that there was at least one way for them to fit exactly on each day. The four marks available should have been an indication that more was needed than the sum of three times equalled another. A few just offered 'yes' (or occasionally 'no').

Candidates employed a wide variety of notations, and the options were rarely laid out clearly.

Question 2

Definitions of squares and direction commands were provided and notations provided for each, yet many candidates offered directions when asked for squares in 2(a), or squares when asked for direction commands in 2(d).

(a) Some candidates gave a full written step-by-step commentary when a list would have sufficed and saved time. ('she goes to Xx where she collects n coins and then goes up n places to...')

(b) Most candidates gave the correct answer, and almost all the rest gave Ae.

(c) (i) Two thirds of candidates answered correctly.

(ii) Some candidates offered 'try again', but the majority gave the required figure. A few wrote the answer as minutes and seconds.

(iii) A few candidates tried to fill in the blanks and determine that there would be a 1 missing, and some offered comments about things being 'most unlikely', or 'usually' despite the question being about deduction. Only a third of candidates gave a sufficient explanation.

(iv) Many candidates noted that the two formed an isolated group, but not all identified why it was De to Ce and not Ce to De. Instead of looking at the last moves of the game, a few used the much more laborious process of finding the patch needed in 2(c)(v) and, with the added information that this was unique, noted that this ended with De to Ce.

(v) Most candidates found the correct path, but many did not use the notation given for directions and listed the squares visited.

(d) Half of the candidates noted the –75, but fewer spotted it was 23 intervals, and very few the 14 seconds that an incorrect command uses up.

Question 3

Some candidates used algebra, but their choice of variables *o* and *t* (presumably for one and two) led to errors, e.g. 2*o* was mistaken for 20.

(a) Most candidates offered the correct time. 17:50 was a common error.

(b) Most candidates either gave the correct amount or the special case (ignoring the break).

(c) Few candidates noted the total of 5 guests and so the correct final answer was rare.

(d) Many candidates gave the correct answer, but one in five gave no response.

(e) Some candidates offered only one half the necessary calculation, and a few just offered the given answer without showing anything at all, or as if by magic: 2250 – 1800 = 450; 9 × 50 = $450. To be confident of credit, a few labels on numbers are recommended. Abuse of notation was common, e.g. 45 × 40 = 1800 ÷ 4 = $450

(f) Few candidates considered overspend at both ends of the range, and many offered 205, 250 or halfway between (sometimes rounded). Some of those who correctly noted the 4:1 ratio applied it the wrong way around, getting 250 – 9 instead of 205 + 9. Some just offered a number such as 215 without any working, and the numbers were not always in the range 205 – 250. 249 was popular.

Question 4

Many candidates appear to have run out of time and did not respond to the later parts of this question. Some candidates did not appreciate that each card had one red number, one blue number and one green number, nor that, for example, all 4s were blue.

(a) Most candidates noted the matching 4 and the total, but the red/green pair that added up to 10 was less often spotted. Not all candidates were careful to give an answer that was specific to the cards

in question, with some offering at best a paraphrase of the stem which listed how 1, 2, or 4 points would be awarded.

(b) Most candidates found all 4 points, but there was some double counting, e.g. 4 + 9 and 9 + 4.

(c) One candidate in three gave no response, and few gave both possibilities.

(d) (i) Many candidates appear to have used some subset of the cards, e.g. the cards shown as being in the first game, rather than all cards. Few showed evidence of a systematic approach, and some listed the same card more than once.

(ii) Few candidates noted the 2-4-8 option.

(e) (i) Half of the candidates gave no response**.** Many candidates offered an answer (usually 14) with no working or explanation.

(ii) Only a third of candidates responded. Even those candidates who offered a complete list with no repeats did not always check that the order was compliant with having one digit not changing.

THINKING SKILLS

Paper 9694/32
Problem Analysis and Solution

Key messages

The title of this paper is 'Problem Analysis and Solution', not just solution, and it is even more important than in Paper 1 to show working and communicate reasoning.

Candidates should show **all** their working in their answer booklet, not just their final answers.

When a response is a sentence or paragraph there is no need to underline it, especially when the quality of handwriting makes it difficult to distinguish underlined from crossed-out.

Candidates should be encouraged to check that their final answer is an answer to the question posed, and that any quantities are plausible in the context, with the digits written without ambiguity.

When logical deduction is called for, correct responses will not use words such as 'likely'.

Not all questions involve numbers, but understanding whether a number represents a discrete quantity or a rounded value is important.

General comments

Questions with numbers were generally handled well in terms of knowing what was needed, although the methods of calculation were often inefficient and error-prone, but those questions calling for logical deduction were rarely done well.

There has been an improvement in showing working and the layout of answers, although some candidates are trying to do their working in the margins.

Comments on specific questions

Question 1

This scenario involved a game with up to 40 correct responses for contestants. Some candidates offered answers that were above 40, and so obviously wrong. Some offered answers which were not whole numbers.

(a) Some candidates either wanted to work out more detail than was possible from the information available or made some extra assumptions which rarely helped.

(b) Most candidates saw that the total was $100 for each question and it did not matter how any one was divided, but many omitted to use any words to identify what the numbers were. Some produced the (given) final answer with a flourish when none of the marks in a 'show that' question are for the final answer.

(c) (i) Those using simultaneous equations typically arrived at the correct answer. Many of those using 'trail and improvement' offered either a sum of 34 or a total of 1240, but few carried on with the improvement.

(ii) A wide variety of answers was given, and they were generally without working. One in three gave no response.

(d) Three-quarters of candidates offered a response, but few noticed that the amount was not linear.

Question 2

Candidates found this question significantly easier than the others, with almost every candidate responding to the first 4 parts.

The handling of percentages was not always correct, e.g. adding 10 per cent is rarely the same as adding 0.1. There were also many examples of premature rounding; it is not possible to correctly compare 31.7 and 31.9 if both have been rounded to 32.

(a) Almost all candidates correctly calculated the score and identified that it was below the threshold.

(b) Some candidates correctly calculated the numbers but drew no conclusion or even made the observation that 31 < 31.9. Numbers that had been calculated in the previous part were not always identified as such, and Examiners should not be relied upon to notice re-use of numbers from earlier working, especially if on another page.

(c) Half of the candidates correctly noted that it could be 1 or 2. Most of the rest just gave one number.

(d) Those candidates who had not rounded the score in earlier parts generally found the answer.

(e) Many candidates gave an answer in dollars. (The units were ignored for marking; this is just to note that they had not fully appreciated the scenario.)

(f) A quarter of candidates offered no response to this or subsequent parts of this question. Very few calculated this threshold correctly, and a wide range of answers were given.

(g) Many candidates correctly identified the lowest possible new score for Wendy, but fewer saw the need to re-calculate Frank's.

(h) Candidates generally found the 35, but not all reduced it (correctly) by 10 per cent. More had difficulty dealing with the 20: adding rather than subtracting or omitting it.

Question 3

Only one in ten omitted this question, but candidates found it considerably harder than the other questions.

Most candidates introduced constraints that were not in the question, such as having to start with left in any sequence or to alternate between systems, thereby turning relatively simple tasks into impossible ones. When an example was asked for, this year candidates rightly did not offer more than one.

(a) A wide variety of ways of combining 1/2 and 1/3 were seen with few, if any, words to indicate why. A few correctly noted that LRLRLR from one and LRRLRR from the other were equally likely, so 5/12 would be L.

(b) A few candidates saw that after an L from each there must be an R, so LLL is impossible. Sundry longer strings were offered, including LLLL, but any associated reasoning was not disclosed.

(c) Many candidates offered a possible allocation for all positions without addressing the question of which two could be determined.

(d) Many candidates offered the simple LRRLRRLRR and did not notice that RRLRRLRR could be augmented with another R.

(e) Some candidates ignored the constraint that there needed to be at least 3 of each system. A quarter gave no response to this or the following part.

(f) Some candidates correctly identified the extreme cases of 156/2 and 156/3, but went no further. A few insisted on using percentages, often rounded, instead of the numbers given.

Question 4

Some of the candidates who had successfully used algebra in **Question 1** did not cope in this question with having two equations in three unknowns and dealing with minimum and maximum values.

(a) Almost all candidates gave the correct total.

(b) Half of the candidates gave the correct total. Responses to **4(a)** and **4(b)** were often identical.

(c) (i) Most candidates either found a collection of tickets adding to $1036, or 44 tickets, and some found 44 tickets adding to $1036 but then did not find the one with the most 5-day tickets.

(ii) Those who had offered a solution for the maximum in **4(c)(i)** sometimes re-used the answer for the minimum.

(d) Many candidates only included one of the two possible days for 3-day tickets.

(e) (i) Most of the candidates who attempted this part merely showed that there was a possible combination that included three 1-day tickets. A deduction was required. The allocation of three marks should have been a hint that (at least) three steps were needed.

(ii) Most candidates did not give a response to this part. Partial credit was very rare.

THINKING SKILLS

Paper 9694/32
Problem Analysis and Solution

Key messages

The title of this paper is 'Problem Analysis and Solution', not just solution, and it is even more important than in Paper 1 to show working and communicate reasoning.

Candidates should show **all** their working in their answer booklet, not just their final answers.

When a response is a sentence or paragraph there is no need to underline it, especially when the quality of handwriting makes it difficult to distinguish underlined from crossed-out.

Candidates should be encouraged to check that their final answer is an answer to the question posed, and that any quantities are plausible in the context, with the digits written without ambiguity.

When logical deduction is called for, correct responses will not use words such as 'likely'.

Not all questions involve numbers, but understanding whether a number represents a discrete quantity or a rounded value is important.

General comments

Questions with numbers were generally handled well in terms of knowing what was needed, although the methods of calculation were often inefficient and error-prone, but those questions calling for logical deduction were rarely done well.

There has been an improvement in showing working and the layout of answers, although some candidates are trying to do their working in the margins.

Comments on specific questions

Question 1

This scenario involved a game with up to 40 correct responses for contestants. Some candidates offered answers that were above 40, and so obviously wrong. Some offered answers which were not whole numbers.

(a) Some candidates either wanted to work out more detail than was possible from the information available or made some extra assumptions which rarely helped.

(b) Most candidates saw that the total was $100 for each question and it did not matter how any one was divided, but many omitted to use any words to identify what the numbers were. Some produced the (given) final answer with a flourish when none of the marks in a 'show that' question are for the final answer.

(c) (i) Those using simultaneous equations typically arrived at the correct answer. Many of those using 'trail and improvement' offered either a sum of 34 or a total of 1240, but few carried on with the improvement.

(ii) A wide variety of answers was given, and they were generally without working. One in three gave no response.

(d) Three-quarters of candidates offered a response, but few noticed that the amount was not linear.

Question 2

Candidates found this question significantly easier than the others, with almost every candidate responding to the first 4 parts.

The handling of percentages was not always correct, e.g. adding 10 per cent is rarely the same as adding 0.1. There were also many examples of premature rounding; it is not possible to correctly compare 31.7 and 31.9 if both have been rounded to 32.

(a) Almost all candidates correctly calculated the score and identified that it was below the threshold.

(b) Some candidates correctly calculated the numbers but drew no conclusion or even made the observation that 31 < 31.9. Numbers that had been calculated in the previous part were not always identified as such, and Examiners should not be relied upon to notice re-use of numbers from earlier working, especially if on another page.

(c) Half of the candidates correctly noted that it could be 1 or 2. Most of the rest just gave one number.

(d) Those candidates who had not rounded the score in earlier parts generally found the answer.

(e) Many candidates gave an answer in dollars. (The units were ignored for marking; this is just to note that they had not fully appreciated the scenario.)

(f) A quarter of candidates offered no response to this or subsequent parts of this question. Very few calculated this threshold correctly, and a wide range of answers were given.

(g) Many candidates correctly identified the lowest possible new score for Wendy, but fewer saw the need to re-calculate Frank's.

(h) Candidates generally found the 35, but not all reduced it (correctly) by 10 per cent. More had difficulty dealing with the 20: adding rather than subtracting or omitting it.

Question 3

Only one in ten omitted this question, but candidates found it considerably harder than the other questions.

Most candidates introduced constraints that were not in the question, such as having to start with left in any sequence or to alternate between systems, thereby turning relatively simple tasks into impossible ones. When an example was asked for, this year candidates rightly did not offer more than one.

(a) A wide variety of ways of combining 1/2 and 1/3 were seen with few, if any, words to indicate why. A few correctly noted that LRLRLR from one and LRRLRR from the other were equally likely, so 5/12 would be L.

(b) A few candidates saw that after an L from each there must be an R, so LLL is impossible. Sundry longer strings were offered, including LLLL, but any associated reasoning was not disclosed.

(c) Many candidates offered a possible allocation for all positions without addressing the question of which two could be determined.

(d) Many candidates offered the simple LRRLRRLRR and did not notice that RRLRRLRR could be augmented with another R.

(e) Some candidates ignored the constraint that there needed to be at least 3 of each system. A quarter gave no response to this or the following part.

(f) Some candidates correctly identified the extreme cases of 156/2 and 156/3, but went no further. A few insisted on using percentages, often rounded, instead of the numbers given.

Question 4

Some of the candidates who had successfully used algebra in **Question 1** did not cope in this question with having two equations in three unknowns and dealing with minimum and maximum values.

(a) Almost all candidates gave the correct total.

(b) Half of the candidates gave the correct total. Responses to **4(a)** and **4(b)** were often identical.

(c) (i) Most candidates either found a collection of tickets adding to $1036, or 44 tickets, and some found 44 tickets adding to $1036 but then did not find the one with the most 5-day tickets.

(ii) Those who had offered a solution for the maximum in **4(c)(i)** sometimes re-used the answer for the minimum.

(d) Many candidates only included one of the two possible days for 3-day tickets.

(e) (i) Most of the candidates who attempted this part merely showed that there was a possible combination that included three 1-day tickets. A deduction was required. The allocation of three marks should have been a hint that (at least) three steps were needed.

(ii) Most candidates did not give a response to this part. Partial credit was very rare.

THINKING SKILLS

Paper 9694/41
Applied Reasoning

Key messages

- In **Question 1**, candidates are expected to analyse the document by quoting directly from the text.
- In **Question 2**, candidates are expected to evaluate the document using the flaws and weaknesses in reasoning listed in the syllabus.
- In **Question 3**, candidates are expected to identify weaknesses in the support given to claims derived from statistical evidence.
- In **Question 4**, candidates are expected to create their own argument structure, ignoring the sequence in which the documents are presented. Assessment of credibility is only one approach to critical engagement with the documents, but it is often inappropriate, particularly if a source for the document has not been given. Other forms of evaluation, including those assessed in **Questions 2** and **3**, can be valid ways of strengthening an argument.

General comments

Most candidates appeared to have enough time to finish the paper with a lot of evidence of time being used to plan answers to **Question 4** more often than in previous sessions. The new task instructions associated with **Question 4** may have had an impact on the quality of some candidates' answers.

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 between 3 and 5 of the 9 marks for analysis. Some candidates were unaware that quoting from the text is necessary for answering this question.

(a) Almost all candidates knew what was required and attempted to identify the conclusion. Most answers were correct. The most common incorrect answer was, 'Subjective sports are damaging the Olympic tradition', seen in around 5 per cent of scripts. Some candidates offered a paraphrase of the correct answer.

(b) Almost all candidates gained at least 1 mark here and most achieved both. Most candidates followed the instruction to give only two answers. Interestingly, some candidates who had given a paraphrased answer in part **(a)** went on to state precise and correct answers in part **(b)**.

(c) A similar proportion of candidates to previous sessions appeared to know what was expected in this question, although many did not.

Candidates needed 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. Some responses summarised the meaning of the paragraph, others evaluated it and some attempted to counter the reasoning.

Of those candidates who were able to precisely identify elements, many did not attempt to demonstrate relationships between named elements, which limited their potential mark to 3 out of

5. The majority of well-prepared candidates were able to score 3 marks on this question because three of the elements were whole sentences.

(d) Unusually for an assumption question, many candidates were able to correctly identify the unstated but assumed step in the reasoning here. However, most offered a quote or paraphrase from the text. It is worth reminding centres that if it is written in the text it cannot be an *unstated* assumption.

Question 2

The vast majority of candidates were aware of the nature of the task and attempted an evaluation for both parts of the question.

(a) 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 don't know the source' (although there were few of these this session). Most responses gained some credit on this question, but this was often just a single mark. Only a small minority of responses achieved more than half of the marks available. Two marks were regularly awarded for identifying the conflation and straw man in paragraph 1 and the appeal to popularity and contradiction in paragraph 5. Two-mark versions of all other points were seen, but rarely. Many candidates seemed aware that parts of the reasoning were weak but few used the correct terms or were able to express weaknesses clearly, so it was relatively common for a candidate to gain one mark for each given answer rather than two. It is worth noting that the use of a single example does not constitute a rash generalisation if its function is merely to illustrate a claim.

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. Answers discussing the credibility of the sources of information are never credited in this question but, nevertheless, many candidate responses did just that.

(a) Although the full range of available marks was seen, few candidates gained more than two marks. All points on the mark scheme, with the exception of bullets 4 and 6, were seen regularly. Answers to this question may have been improved my more careful study of the question and document. A number of candidates attempted to evaluate the information above the table and many had clearly not read the explanatory information under the table.

(b) Candidates found this part of the question a little easier. Around half of candidates achieved at least a mark and many scored two. All marking points were seen but a version of the final bullet was the most common.

Question 4

This was the first session in which candidates were given extra instruction within the question that was intended to help candidates construct appropriate responses.

Candidates were required to use the documents to construct a reasoned case to support or challenge the conclusion that 'Subjective sports should be included in the Olympics'. Almost all candidates were able to engage with this topic and attempted to construct their own arguments, although a few relied, at least partially, 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, scored well in the structure skill.

Despite the instruction to 'use and evaluate evidence from documents', the proportion of candidates who were using the documents with a critical eye was only marginally higher than in previous sessions, which meant that marks for 'use of documents' did not often rise above level 1. Many of those responses that did attempt evaluation of the documents limited their critical comments to discussions of credibility. Other approaches to evaluation exist. For example, one could question Document 1's dismissal of temporary uncertainty in non-subjective sports or the stipulative definition of the Olympic ideal present in Document 3.

Arguments can be made stronger by anticipating and responding effectively to counter positions and candidates were prompted to do this by the new instructions. Indeed, many candidates this session included a lengthy paragraph explaining a key counter position. However, a large proportion of these responses failed to respond to this counter position, either effectively or in any way at all. The presence of a well-reasoned

counter position without any response is, at best, a waste of time and is likely to weaken the overall argument.

It is worth reminding centres that what is likely to get high marks is a persuasive argument that addresses the precise conclusion given with a clear structure that is supported by thoughtful, particularly critical, use of the documents and that thoughtfully considers *and dismisses* relevant alternative viewpoints.

THINKING SKILLS

Paper 9694/42
Applied Reasoning

Key messages

- In **Question 1**, candidates are expected to analyse the document by quoting directly from the text.
- In **Question 2**, candidates are expected to evaluate the document using the flaws and weaknesses in reasoning listed in the syllabus.
- In **Question 3**, candidates are expected to identify weaknesses in the support given to claims derived from statistical evidence.
- In **Question 4**, candidates are expected to create their own argument structure, ignoring the sequence in which the documents are presented. Assessment of credibility is only one approach to critical engagement with the documents, but it is often inappropriate, particularly if a source for the document has not been given. Other forms of evaluation, including those assessed in **Questions 2** and **3**, can be valid ways of strengthening an argument.

General comments

Most candidates appeared to have enough time to finish the paper with some evidence of time being used to plan answers to **Question 4**. The new task instructions associated with **Question 4** may have had an impact on the quality of some candidates' answers.

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 between 5 and 7 of the 8 marks for analysis. Some candidates were unaware that quoting from the text is necessary for answering this question.

(a) Almost all candidates knew what was required and attempted to identify the conclusion. A large majority of answers were correct but some candidates, having identified the correct part of the passaged, then offered a paraphrase of that part.

(b) Almost all candidates gained at least 1 mark here and most achieved both marks. Most candidates followed the instruction to give only two answers. Interestingly, some candidates who had given a paraphrased answer in part **(a)** went on to state precise and correct answers in part **(b)**.

(c) Candidates needed 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. Only around a third of candidates knew what was required in this question; of those, a majority scored at least one mark and one candidate scored all five. 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 did not name the elements and some did not demonstrate relationships between them. Some candidates used the term reasoning (as opposed to 'reason'), which was not credited.

(d) Some candidates were able to gain a mark for identifying the third or fourth assumptions listed on the mark scheme. However, most offered a quote or paraphrase from the text, often 'that maths and science are the really useful subjects'. It is worth reminding centres that, if it is written in the text, it cannot be an unstated assumption.

Question 2

The vast majority of candidates were aware of the nature of the task and attempted an evaluation for both parts of the question.

(a) 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 don't know the source' (although there were few of these this session). Most responses gained some credit on this question and the full range of available marks was seen. Each of the weaknesses listed in paragraphs 4 and 5 on the mark scheme were credited occasionally but marks were most commonly gained for noticing the rash generalisation or causal flaw regarding the history graduate's predicament in paragraph 6. Descriptions of the other flaws in paragraph 6 were rarely seen. Many candidates identified stated claims as assumptions and were not credited.

(b) Invalid deduction is one of the less frequently assessed flaws and only a handful of candidates appeared to recognise the term. Even those that did rarely explained it sufficiently well to be awarded both marks.

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.

(a) Only a handful of candidates recognised that the way the data were collected ignored the relative value given to each subject.

(b) Most candidates gained some credit here, most often for versions of the second, third, fourth or sixth bullet points on the mark scheme. Answers that questioned the credibility of the source were, as ever, not credited.

Question 4

Candidates were required to use the documents to construct a reasoned case to support or challenge the conclusion that 'History should not be taught in schools'. Most candidates were able to engage with this topic and attempted to construct their own arguments. However, a higher proportion of candidates than in recent sessions relied, at least partially, 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, scored higher than level 1 for the structure skill. However, only a minority of candidates were using the documents with a critical eye, which meant the marks for 'use of documents' did not often rise above level 1. Many of those responses that did attempt evaluation of the documents limited their critical comments to discussions of credibility. It is worth noting that other approaches to evaluation exist. For example, when supporting the conclusion one could point out that the quote from Arthur Marwick in Document 2 is a straw man or, when challenging the conclusion, that Document 1's accusations of teacher bias in history could equally well be applied to literature lessons.

Arguments supporting the conclusion were strengthened by effectively responding to objections about freedom of choice or problems with other subjects; those challenging the conclusion were strengthened if they effectively addressed the problem of potential harm associated with biased teaching. It is worth reminding centres that what is likely to get high marks is a persuasive argument that addresses the conclusion given with a clear structure that is supported by thoughtful, particularly critical, use of the documents and that thoughtfully considers and dismisses relevant alternative viewpoints.

THINKING SKILLS

Paper 9694/43
Applied Reasoning

Key messages

- In **Question 1**, candidates are expected to analyse the document by quoting directly from the text.
- In **Question 2**, candidates are expected to evaluate the document using the flaws and weaknesses in reasoning listed in the syllabus.
- In **Question 3**, candidates are expected to identify weaknesses in the support given to claims derived from statistical evidence.
- In **Question 4**, candidates are expected to create their own argument structure, ignoring the sequence in which the documents are presented. Assessment of credibility is only one approach to critical engagement with the documents, but it is often inappropriate, particularly if a source for the document has not been given. Other forms of evaluation, including those assessed in **Questions 2** and **3**, can be valid ways of strengthening an argument.

General comments

Most candidates appeared to have enough time to finish the paper with some evidence of time being used to plan answers to **Question 4**. The new task instructions associated with **Question 4** may have had an impact on the quality of some candidates' answers.

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 between 5 and 7 of the 8 marks for analysis. Some candidates were unaware that quoting from the text is necessary for answering this question.

(a) Almost all candidates knew what was required and attempted to identify the conclusion. A large majority of answers were correct but some candidates, having identified the correct part of the passaged, then offered a paraphrase of that part.

(b) Almost all candidates gained at least 1 mark here and most achieved both marks. Most candidates followed the instruction to give only two answers. Interestingly, some candidates who had given a paraphrased answer in part **(a)** went on to state precise and correct answers in part **(b)**.

(c) Candidates needed 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. Only around a third of candidates knew what was required in this question; of those, a majority scored at least one mark and one candidate scored all five. 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 did not name the elements and some did not demonstrate relationships between them. Some candidates used the term reasoning (as opposed to 'reason'), which was not credited.

(d) Some candidates were able to gain a mark for identifying the third or fourth assumptions listed on the mark scheme. However, most offered a quote or paraphrase from the text, often 'that maths and science are the really useful subjects'. It is worth reminding centres that, if it is written in the text, it cannot be an unstated assumption.

Question 2

The vast majority of candidates were aware of the nature of the task and attempted an evaluation for both parts of the question.

(a) 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 don't know the source' (although there were few of these this session). Most responses gained some credit on this question and the full range of available marks was seen. Each of the weaknesses listed in paragraphs 4 and 5 on the mark scheme were credited occasionally but marks were most commonly gained for noticing the rash generalisation or causal flaw regarding the history graduate's predicament in paragraph 6. Descriptions of the other flaws in paragraph 6 were rarely seen. Many candidates identified stated claims as assumptions and were not credited.

(b) Invalid deduction is one of the less frequently assessed flaws and only a handful of candidates appeared to recognise the term. Even those that did rarely explained it sufficiently well to be awarded both marks.

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.

(a) Only a handful of candidates recognised that the way the data were collected ignored the relative value given to each subject.

(b) Most candidates gained some credit here, most often for versions of the second, third, fourth or sixth bullet points on the mark scheme. Answers that questioned the credibility of the source were, as ever, not credited.

Question 4

Candidates were required to use the documents to construct a reasoned case to support or challenge the conclusion that 'History should not be taught in schools'. Most candidates were able to engage with this topic and attempted to construct their own arguments. However, a higher proportion of candidates than in recent sessions relied, at least partially, 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, scored higher than level 1 for the structure skill. However, only a minority of candidates were using the documents with a critical eye, which meant the marks for 'use of documents' did not often rise above level 1. Many of those responses that did attempt evaluation of the documents limited their critical comments to discussions of credibility. It is worth noting that other approaches to evaluation exist. For example, when supporting the conclusion one could point out that the quote from Arthur Marwick in Document 2 is a straw man or, when challenging the conclusion, that Document 1's accusations of teacher bias in history could equally well be applied to literature lessons.

Arguments supporting the conclusion were strengthened by effectively responding to objections about freedom of choice or problems with other subjects; those challenging the conclusion were strengthened if they effectively addressed the problem of potential harm associated with biased teaching. It is worth reminding centres that what is likely to get high marks is a persuasive argument that addresses the conclusion given with a clear structure that is supported by thoughtful, particularly critical, use of the documents and that thoughtfully considers and dismisses relevant alternative viewpoints.