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.

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. 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.

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.

General comments

In general, the candidates engaged well with the paper, though responses were variable in quality. There were some good scripts showing a commendable proficiency in problem solving. Most candidates offered good responses to at least some of the questions on the paper. It was particularly pleasing to see that when candidates were not able to solve earlier questions, 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.

Comments on specific questions

Question 1

Most candidates made a good attempt at both parts of this question. It was common to see the number of days between consecutive visits listed on the right-hand side of the table and from this the answers could be deduced.

(a) Responses were expressed in a variety of ways: as the visit number (5), as the date of the visit (25 April) or as the gap (9–25 April). Each of these was acceptable for the single mark.

(b) The time interval was expressed in terms of the visit numbers or the dates of the visits. Errors were usually due to incorrect counting of the number of days between visits.

Question 2

(a) Only a minority of candidates negotiated this request successfully. The least cost per person is achieved when as many people as possible are in a group of between 11 and 20. Therefore, the party of 46 people should be split into three or four groups each of size between 11 and 20. This can be done in a variety of ways, but in each case, the total cost for the party will be 46 × $12 or $552. One very common incorrect answer was $570, arising from splitting the party into groups of size 20, 20 and 6. A second common incorrect answer was $39, arising from splitting the party into groups of size 20, 20 and 6 and then incorrectly using the given charge per person as the charge per group, so $12 + $12 + $15.

(b) A very common answer in this part was $500. This comes from groups of 20 and 18 children, with a charge of 38 times $10, and a group of 8 adults, with a charge of 8 times $15. In fact, this total

cost can be reduced by placing the 8 adults with 3 children in a group of 11, so that the charge for each person is $12 ($132). The remaining 35 children are placed in two groups with the charge for each child being $10 ($350).

Question 3

(a) Most candidates used a search method to find the correct combination of 4 boxes of 7 and 6 boxes of 12 that give the required 100 chairs.

(b) Again, most candidates used a search method to find the correct combination of 5 boxes of 7 and 3 boxes of 12 that give the required 71 chairs.

(c) The key to this part was to realise that 6 boxes of 12 chairs would give 72 chairs, just one more than was needed, for $240 rather than the $245 cost of 71 chairs found in **part (b)**. Only a small minority of candidates made the required realisation.

Question 4

(a) Over half of the candidates listed the three correct possibilities for the three onions that had a total weight of within 2 g of 360 g. The remaining candidates usually gave one or two of the correct possibilities. Very few incorrect combinations of weights were seen.

(b) Half of the candidates identified the 128 g onion as the one left in the box. There was very little working to be seen, so it was not possible to understand how any incorrect answers had been deduced.

Question 5

(a) (i) Mr Richmond intends to choose the top four players in one of the listed categories, so the easiest approach is to list the top four players in each category and identify the player, apart from Donald, who is common to all three lists. This player is William.

(ii) The listing in **part (i)** enables the deduction that James and Simon are certain not to be on the team. Although many candidates identified these two players, other players were also included in their answers. A list consisting of James, Simon and two other players was often seen, with the two other players being fairly randomly distributed.

(b) With the revised selection approach, three of the four players on the team can be identified as Mark, Tony and Pete, the top player in each category. The fourth player on the team is the one with the highest total score (Donald, Frank and William each have 51) and with the highest Skill rating, so Frank. Half of the candidates correctly listed the four team players. Other candidates gave a list which included William and/or Donald, seemingly carrying forward the situation in **part (a)**. It is important to note that the method of choosing the team has now changed, indicated by the description in the new stem and emphasised by the word ‘now’ in the request in **part (b)**. Other candidates gave incomplete lists, usually either the three players Mark, Tony and Pete or the single player Frank.

(c) Only 4 per cent of the candidates were able to offer a satisfactory explanation as to why James would not be selected for the team. The key fact is that James has lower scores in all three ratings than Donald, Mark, Simon and William. This means that whatever multiples are used, James’ overall score will always be lower than the overall scores of all four of these players.

Most candidates offered a vague statement to the effect that James did not score well in any category. Whilst this is true, it needs to be backed up with some convincing detail.

A small minority of candidates stated that James had scored the second lowest score in each category and that his total score was the lowest overall, and this was deemed to be worthy of one of the two marks.

Question 6

(a) Just under half of the candidates deduced correctly that three baseball caps would be given away to callers to Speak Radio. The question states that that the final caller receives the tenth pen and the third T-shirt. From this it can be deduced that this must be caller number 30. Since baseball caps are given away to every eighth caller, it means that of the 30 callers, those numbered 8, 16 and 24 will receive a cap. The varied incorrect answers to this part were usually the result of candidates not deducing that the total number of callers was 30.

(b) (i) Only a small minority of candidates were successful in this part, with 28 per cent not making any attempt. Those candidates who made progress usually began by writing out a schedule of callers, identifying which ones were given prizes. For example, caller 3 received a pen, caller 6 a pen, caller 8 a cap, caller 9 a pen, caller 10 a T-shirt, and so on. Continuing with this, or shortening the process once a pattern is spotted, leads to the first 120 callers receiving 40 pens, 15 caps and 12 T-shirts, a total of 67 prizes. The next prize given away will be a pen given to caller 123. This was sometimes seen as the answer to the question. In fact, callers 124 and 125 do not receive a prize, so the total is still 68.

(ii) In the given time period, there are 10 callers per hour for 10 hours per day for 7 days per week, so a total of 700 callers. This leads to the conclusion that the numbers of pens, baseball caps and T-shirts given away are 700, 140 and 70 respectively. These numbers need to be increased by 10 per cent leading to 770, 154 and 77 respectively.

Of the 50 per cent of candidates who attempted this part, half were successful and the other half either did not add on the extra 10 per cent or made an arithmetical slip in their counting or calculation.

Question 7

(a) 28 per cent of candidates negotiated this part successfully. The first step is to determine whether the charge of $8.94 comes from entry before or after 14:00. This is achieved by subtracting the base charge and then determining whether the remaining amount is divisible by 6 and/or 4. If entry had been before 14:00, the amount from the charge per minute would be $8.94 minus $2.50, i.e. $6.44. This is not divisible exactly by 6 so entry cannot have been before 14:00. Subtracting $1.50 from $8.94 to give $7.44 and then dividing by 4 gives the number of minutes as 186. A common error was to assume that entry before 14:00 was possible, achieved by dropping the remainder when dividing by 6.

(b) This part used the initial given information in a different way and did not depend on success in **part (a)**. However it was clear that candidates who had struggled with **part (a)** did not attempt it.

Question 8

This was an unusual question which depended solely on understanding the given information and the example for the tree starting at V.

(a) Although only a minority of candidates were able to draw the complete tree starting at G, a pleasing number were able to identify the letters involved as S, T, A and U and give a partially correct tree earning one of the two marks.

(b) This part required a good understanding of the situation and proved to be too difficult for most candidates.

Question 9

The grandson walks 120 m to reach the oak tree. He then runs ahead of his grandparent to the west gate which is 480 m away before returning to his grandparent. Meanwhile, the grandparent has walked for 200 seconds at 1.5 m/s, covering a distance of 300 m. This means that the grandson only needs to run back for 180 m to meet his grandparent again. So up to this point of reunion, the grandson has travelled 120 m + 480 m + 180 m, a total of 780 m. The two have still to walk together for another 180 m to reach the west gate, giving a total distance of 960 m for the grandson.

A significant number of candidates omitted this final 180 m and gave the answer 780 m, scoring two of the three marks.

Question 10

(a) There are different approaches to solving this problem. Most involve finding a set of ages which sum to around 100. One possible starting point is that the ages of Mr and Mrs Beach when Sandy is born are 28 and 22 respectively, so (28, 22, 0) is one set of ages, with a sum of 50. Aiming for a total close to 100, we note that on Sandy's 16th birthday, the ages (44, 38, 16) sum to 98. In order to achieve a total of 100, we need two of the three to have had their next birthday. This leads to the set (45, 39, 16) which is valid from Mrs Beach's birthday until the day before Sandy's 17th birthday. The dates are therefore 4th June to 10th June in 2034. About one-quarter of candidates gave the correct range of possible dates. Other candidates gave a range that included some of the correct dates, usually with the correct year 2034. One-third of the candidates made no attempt at solving this problem.

(b) This variation on the problem posed in **part (a)** required candidates to work with a total of 99 years instead of 100 years. This leads to a range of 25th May to 3rd June 2034 as the celebration must now be on a date from the day of Mr Beach's birthday and before Mrs Beach's birthday. This is a longer range of possibilities than in **part (a)**. Only half of the candidates made any attempt at this part and very few were successful.

Question 11

This question is a long one with progressively more demanding requests. This was reflected in the attempts made by the candidates and by the numbers who scored marks. At least 50 per cent of candidates only attempted **part (a).**

(a) (i) Since each contestant starts with 20 points, the question is asking for the least number of correct answers that would result in Tom scoring 31 points. Each correct answer is worth 3 points, so he must have answered at least 11 questions correctly (with 2 incorrect). 36 per cent of candidates answered this part correctly. Other answers seen covered most numbers between 2 and 19.

(ii) If Tom answers 13 questions correctly, he will score at least 39 – 7 = 32 points, so he can only possibly have answered 12 correctly to score 31 points. Only 16 per cent of candidates answered this part correctly. The most common incorrect answer was 11.

(b) A minority of candidates answered this correctly, usually by a trial-and-error method.

(c) Of the minority of candidates who attempted this part, most calculated only the number of points that would have been scored if this had been a Booster round.

(d) By this part, most candidates had abandoned this question and only a handful of candidates made any progress.

Question 12

This question proved to be very challenging, not unexpectedly for the last question on the paper.

A few candidates were able to deduce from the third piece of information in the bullet points that there are 4 *quinbins* that are *mallocks*. This was usually followed by the incorrect assumption that there must therefore be 4 *mallocks*.

Following on from this incorrect assumption, since half of all *mallocks* are *wooblers* there must be 2 *wooblers*. And therefore 2 out of 12 *quinbins* are *wooblers*. This was by far the most common answer.

THINKING SKILLS

Paper 9694/12
Problem Solving

Key messages

- Whilst there has been a general improvement in the layout of most candidates' work, there is still a significant minority who are giving jottings randomly placed in the answer area. This makes it difficult if not impossible to follow the logic of the answer and part marks can be lost.
- We are still seeing candidates giving more than one solution without making it clear what their final intended answer was.

General comments

Questions seemed to be accessible to the majority of candidates and there seemed to be sufficient time for candidates to reach the end of the paper. Most candidates attempted the majority of the questions and there were fewer questions not attempted than seen previously.

Comments on specific questions

Question 1

(a) This question was answered correctly by the majority of candidates. The few candidates who did not obtain the correct answer usually understood what method needed to be used but made arithmetic errors.

(b) Nearly all candidates attempted this question with the majority answering correctly. The candidates who did not score generally did not read the question carefully enough and stated that the total for Zone C was incorrect despite the question making it clear that the totals were correct.

(c) Candidates found this part of the question to be the most challenging with just under half the candidates giving the correct answer. A significant number of the candidates who did not give the correct answer had recognised that over 50 per cent of the data needed to be in one category for each total for it to match the pie chart, but chose Zone A rather than Eagle because they had not considered how far above 50 per cent the category was.

Question 2

The majority of candidates attempted this question with just over a quarter scoring full marks. Over half of candidates did not score at all. The most successful candidates often listed the teams and wrote down the number of unique games each would play, e.g. for the group of eight teams T1 – 7, T2 – 6, ... , T8 – 1. 7 + 6 + ... + 1 = 28. Candidates using this method usually laid their method out logically, which made it easy for them to spot the patterns.

A common incorrect method seen used 8 × 7 + 7 × 6 +1 to find the new number of games played. However, the candidates did not realise this counted each game played in the groups twice.

Question 3

Almost all candidates attempted this question, with over half scoring full marks.

Many candidates who did not score understood what the question was asking of them but made arithmetic errors, meaning the correct categories were unlikely to be selected.

Whilst many candidates used various trials to attempt to find scores that would give them a total of 116, the most efficient methods seen involved taking of a total score of one mark for each question answered correctly in all the categories, then working with the excess points scored, which simplified the calculations required.

Question 4

The three parts of **Question 4** were linked and information from previous parts was needed to answer the later parts. Candidates often did not read the information carefully enough and whilst progress towards correct answers was seen, in many cases the final answer was spoiled by a misinterpretation of the information.

(a) This part of the question was answered by almost all candidates, with over 60 per cent scoring full marks. Most successful candidates found the total cost of the journey then deducted the 20 per cent discount. Common errors which earned one mark included finding the cost of the journey one way only or taking the 20 per cent discount off the $2 base cost without including the mileage cost. Candidates who did not score often misinterpreted the ticket costs and charged both the $2 and $0.10 for every kilometre travelled.

(b) Most candidates attempted this part of the question, with scores being reasonably evenly split between 0, 1 and 2 marks. The most common misconceptions seen were charging $0.80 for the first kilometre travelled, then charging the cost of the additional kilometres for 15 kilometres rather than 14 or using the taxi both ways rather than the cheaper bus journey to the party and the taxi for the return journey.

(c) About a third of candidates answered this part successfully. Candidates who did not score often used the cost of the taxi journey home as the amount of money saved, without recognising that he would have to pay for the bus home so the cost of this had to be deducted to find the saving.

Question 5

(a) This question required candidates to find the difference between the number of seats in the first and last rows of the concert hall and find a factor of this difference that would allow the number of seats in the row to increase, whilst taking into consideration the constraints of the number of rows. Almost half of the candidates answered the question correctly and about a third scored no marks.

The most successful candidates found the difference of 44 and looked at the factor pairs, i.e. 1 × 44, 2 × 22, 4 × 11. As the constraint limited the number of rows to more than 5 and less than 20, the only suitable pair to work with was 4 × 11. Candidates who scored part marks usually followed the same logic but increased the number of seats in each row by 11 rather than by 4, which gave them five rows in total rather than *more than* five rows.

(b) About two thirds of candidates attempted this question, with approximately a fifth scoring full marks. As the question is about percentages and gives no actual prices, a significant number of candidates made little progress. Candidates who did score usually used one of two methods. The most effective method was to set a simple price for the standard tickets, e.g. $10, then work with $7 for the discounted tickets and work out the price needed for the remainder. The second method was to use algebra; however, there were often errors in the setup, such as using 0.3x as the discounted price rather than 0.7x.

Question 6

Over three-quarters of candidates attempted this question, with about 45 per cent of candidates scoring full marks. The question did not involve a lot of calculation. Candidates needed to see how many numbers there would be in a sequence, starting at 10 and increasing by 2, before one of the numbers exceeded 25. Many candidates overcomplicated the question because they had not read it carefully enough. Many candidates tried to work out total profits and gave this as an answer rather than the number of manufacturing cycles that should be run. A common misconception was to say that as many cycles as possible should be run during the day without realising that the increasing costs would mean a loss was being made on later cycles.

Question 7

(a) (i) About two thirds of candidates scored on this question, with over half gaining full marks.

Most candidates used trials to find the points that would give the required additional total of 14. Some candidates ignored the statement that she improved her position in each event and gave the correct positions but in the wrong order. Some candidates got confused between the points awarded and the positions Fay was ranked in.

(ii) Most candidates attempted this question, with over half scoring at least one mark. It was a relatively straightforward 'explain' question where the candidate needed to point out the maximum score Fay could achieve was 36 and the minimum score Eve could achieve was 37. The numbers attached to Fay and Eve needed to be seen to score full marks. Many candidates who did not score were on the right path but were too vague in their response, e.g. 'If Fay did well and Eve did not do very well in the last two events' was not sufficient.

(b) About a fifth of candidates did not attempt this question and only about a further fifth scored on it. The successful candidates realised that they needed to find the total marks available during the four events and subtract the totals we already knew, leaving them with the total for the three remaining competitors, which could then be divided between them. A common misconception was to assume that, because the three competitors were in the bottom three places overall after four events, they could only have been in places six, seven or eight for all the previous events.

(c) This part of the question was answered more successfully than the previous part with almost half of candidates scoring at least one mark. Most successful candidates started working with Joy as she could be worked out easily, then moved on to Ian. A common error was to include Ian in fourth place for one of his events, despite having previously worked out that Joy was in fourth place for all of hers. There was again some confusion between the position ranked in and the points scored.

Question 8

Most candidates attempted this question, with over half scoring at least one mark. The candidate was required to find a correct password from two incorrect attempts and to explain how they had deduced it. Whilst many candidates were able to give the correct password, the explanations were often insufficient with some just repeating the question.

The successful candidates usually started with one of two logical first steps. They either pointed out that the second password was short so must be missing a character and after comparing it to the first, it must be the '&' in the third place; or pointed out that the password must contain a symbol and the only symbol seen in the two passwords is the '&' in the third place. After that it could be stated that, as there could be only one error in each trial, the rest of the second password must be correct.

Several candidates gave more than one password and said that any of them could be correct. As the question asks for his password rather than possible passwords, giving more than one answer meant a correct answer within them did not score unless selected in some way.

Question 9

Candidates found this question challenging, with many not able to progress beyond stating the consumption had increased or decreased without any supporting calculations. Successful candidates often did not choose the most efficient route. Whilst many of them chose a value to put in as a population, they did not often use the simplest value of 100, which meant additional calculations needed to take place converting to a percentage as a final step.

It was obvious that many did not realise that if 17 per cent of the population ate fish every day, that would give an average consumption of 17 per cent without needing to do any further calculations as 17 being multiplied by 7, then divided by 7 was seen reasonably regularly.

Some candidates tried to work with daily differences in the percentages, and whilst this would have led to the correct answer if handled correctly, most candidates got confused with the negative values and made arithmetic errors.

Question 10

(a) More than three quarters of candidates attempted this question, with almost a third scoring full marks. Successful candidates usually found possible times for the given distances for the two speeds and looked for the ones that gave the same time. The most efficient candidates realised that, for the times to be the same, the shorter distance would have to go with a lower speed and reduced the number of trials that needed to be made. Having found the correct time, candidates generally went on to complete the question correctly.

The most common misconception was to assume the 3 km distance paired with the 4.5 km/h time and not checking for a common time.

Some candidates did not score full marks because it was unclear what their final answers were, because of the layout of their method.

(b) After finding **part (a)** challenging, almost two-fifths of candidates did not attempt the second part. More than half of the candidates who did attempt it managed to score at least one mark.

The most successful candidates recognised that only the speeds needed to be worked with and the times and distances from the previous part could be ignored.

Common errors included finding a third of the speed rather than reducing it by a third and finding the average of the original speeds without the reduction.

Question 11

(a) Most candidates attempted this question, with just under half scoring at least some marks. This is a four-mark question so candidates should expect several steps to be required to answer it.

The information needs to be read carefully but many responses make it clear that this is not being done, with candidates working with 200 cakes and $440 or 118 cakes and $440 to find the cakes sold. The first step in this question should have been to deal with the three customers buying 10 cakes for $33. Once these are removed, this leaves 88 cakes sold for $341. The price of $5 for an individual cake should allow candidates to quickly check the feasibility of the number of groups of six cakes sold.

(b) The number of candidates who tackled this part of the question reduced, probably due to finding the first part difficult. Of those who did attempt it, about half of them scored at least one of the two marks.

Despite it stating clearly earlier in the question that there are 82 cakes remaining, a surprising number of candidates attempted to work out how many cakes they had left to sell, often giving the 88 cakes from the previous part of the question.

Many candidates working with the correct figures only scored one of the marks because they only looked at the most obvious sales option and did not consider anything else, i.e. they sold eight lots of 10 cakes and two individual cakes, whereas the combination of seven lots of 10 cakes and two lots of 6 cakes gave them the answer they were looking for.

(c) (i) Over two-thirds of candidates attempted this question, with about a quarter of candidates scoring full marks. Candidates needed to deduct the costs from the money taken so far, work out how much more would have to be taken to reach $200 profit and divide this by 30. Most candidates seemed to understand the method that would be needed but many made mistakes with the numbers they used. The most common examples of numbers used incorrectly was using 82 cakes to be sold rather than 30 and the $80 stall hire charge being replaced by $200.

A number of candidates also ignored the statement that there was no discount for six or ten cakes and tried to introduce discounts.

(ii) The final part of this question was the most frequently not attempted question, with almost half of candidates missing it. This will be partly down to finding previous parts difficult and partly due to time constraints. The simplest method for this question was to sell the remaining 52 cakes at the cost found in the previous part and add the $200 profit already accounted for. Many candidates

chose to start again and produced a large volume of calculations, most of which repeated earlier work. It would make sense for candidates to consider how many marks a question is worth. This is a one-mark question with a relatively small answer space, so a candidate should not be expecting to complete half a page of calculations and they need to consider if they are doing unnecessary work.

Question 12

The final question on the paper is often the one attempted by the least number of candidates, either due to its difficulty level or time constraints. Over two-thirds of candidates attempted this one. Of the candidates who attempted the question, about a half of them scored some or all marks.

Methods used fell into two main categories, which were trial and improvement methods and algebraic methods.

The candidates using algebraic methods often scored all or no marks as, if they were able to set up the algebra correctly, they were usually able to solve it accurately. Some started to set up algebra for each individual but were unable to connect it together. It is worth reminding candidates that algebra is not essential to answer any question, so substituting a value at this stage would probably have gained them at least one mark for a trial.

Candidates using trial methods scored a range of marks, as sometimes they did not go on to find the final answer.

Barbara walking an additional 10 km was often ignored.

THINKING SKILLS

Paper 9694/13
Problem Solving

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(b) Nearly all candidates attempted this question with the majority answering correctly. The candidates who did not score generally did not read the question carefully enough and stated that the total for Zone C was incorrect despite the question making it clear that the totals were correct.

(c) Candidates found this part of the question to be the most challenging with just under half the candidates giving the correct answer. A significant number of the candidates who did not give the correct answer had recognised that over 50 per cent of the data needed to be in one category for each total for it to match the pie chart, but chose Zone A rather than Eagle because they had not considered how far above 50 per cent the category was.

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(ii) Most candidates attempted this question, with over half scoring at least one mark. It was a relatively straightforward 'explain' question where the candidate needed to point out the maximum score Fay could achieve was 36 and the minimum score Eve could achieve was 37. The numbers attached to Fay and Eve needed to be seen to score full marks. Many candidates who did not score were on the right path but were too vague in their response, e.g. 'If Fay did well and Eve did not do very well in the last two events' was not sufficient.

(b) About a fifth of candidates did not attempt this question and only about a further fifth scored on it. The successful candidates realised that they needed to find the total marks available during the four events and subtract the totals we already knew, leaving them with the total for the three remaining competitors, which could then be divided between them. A common misconception was to assume that, because the three competitors were in the bottom three places overall after four events, they could only have been in places six, seven or eight for all the previous events.

(c) This part of the question was answered more successfully than the previous part with almost half of candidates scoring at least one mark. Most successful candidates started working with Joy as she could be worked out easily, then moved on to Ian. A common error was to include Ian in fourth place for one of his events, despite having previously worked out that Joy was in fourth place for all of hers. There was again some confusion between the position ranked in and the points scored.

Question 8

Most candidates attempted this question, with over half scoring at least one mark. The candidate was required to find a correct password from two incorrect attempts and to explain how they had deduced it. Whilst many candidates were able to give the correct password, the explanations were often insufficient with some just repeating the question.

The successful candidates usually started with one of two logical first steps. They either pointed out that the second password was short so must be missing a character and after comparing it to the first, it must be the '&' in the third place; or pointed out that the password must contain a symbol and the only symbol seen in the two passwords is the '&' in the third place. After that it could be stated that, as there could be only one error in each trial, the rest of the second password must be correct.

Several candidates gave more than one password and said that any of them could be correct. As the question asks for his password rather than possible passwords, giving more than one answer meant a correct answer within them did not score unless selected in some way.

Question 9

Candidates found this question challenging, with many not able to progress beyond stating the consumption had increased or decreased without any supporting calculations. Successful candidates often did not choose the most efficient route. Whilst many of them chose a value to put in as a population, they did not often use the simplest value of 100, which meant additional calculations needed to take place converting to a percentage as a final step.

It was obvious that many did not realise that if 17 per cent of the population ate fish every day, that would give an average consumption of 17 per cent without needing to do any further calculations as 17 being multiplied by 7, then divided by 7 was seen reasonably regularly.

Some candidates tried to work with daily differences in the percentages, and whilst this would have led to the correct answer if handled correctly, most candidates got confused with the negative values and made arithmetic errors.

Question 10

(a) More than three quarters of candidates attempted this question, with almost a third scoring full marks. Successful candidates usually found possible times for the given distances for the two speeds and looked for the ones that gave the same time. The most efficient candidates realised that, for the times to be the same, the shorter distance would have to go with a lower speed and reduced the number of trials that needed to be made. Having found the correct time, candidates generally went on to complete the question correctly.

The most common misconception was to assume the 3 km distance paired with the 4.5 km/h time and not checking for a common time.

Some candidates did not score full marks because it was unclear what their final answers were, because of the layout of their method.

(b) After finding **part (a)** challenging, almost two-fifths of candidates did not attempt the second part. More than half of the candidates who did attempt it managed to score at least one mark.

The most successful candidates recognised that only the speeds needed to be worked with and the times and distances from the previous part could be ignored.

Common errors included finding a third of the speed rather than reducing it by a third and finding the average of the original speeds without the reduction.

Question 11

(a) Most candidates attempted this question, with just under half scoring at least some marks. This is a four-mark question so candidates should expect several steps to be required to answer it.

The information needs to be read carefully but many responses make it clear that this is not being done, with candidates working with 200 cakes and $440 or 118 cakes and $440 to find the cakes sold. The first step in this question should have been to deal with the three customers buying 10 cakes for $33. Once these are removed, this leaves 88 cakes sold for $341. The price of $5 for an individual cake should allow candidates to quickly check the feasibility of the number of groups of six cakes sold.

(b) The number of candidates who tackled this part of the question reduced, probably due to finding the first part difficult. Of those who did attempt it, about half of them scored at least one of the two marks.

Despite it stating clearly earlier in the question that there are 82 cakes remaining, a surprising number of candidates attempted to work out how many cakes they had left to sell, often giving the 88 cakes from the previous part of the question.

Many candidates working with the correct figures only scored one of the marks because they only looked at the most obvious sales option and did not consider anything else, i.e. they sold eight lots of 10 cakes and two individual cakes, whereas the combination of seven lots of 10 cakes and two lots of 6 cakes gave them the answer they were looking for.

(c) (i) Over two-thirds of candidates attempted this question, with about a quarter of candidates scoring full marks. Candidates needed to deduct the costs from the money taken so far, work out how much more would have to be taken to reach $200 profit and divide this by 30. Most candidates seemed to understand the method that would be needed but many made mistakes with the numbers they used. The most common examples of numbers used incorrectly was using 82 cakes to be sold rather than 30 and the $80 stall hire charge being replaced by $200.

A number of candidates also ignored the statement that there was no discount for six or ten cakes and tried to introduce discounts.

(ii) The final part of this question was the most frequently not attempted question, with almost half of candidates missing it. This will be partly down to finding previous parts difficult and partly due to time constraints. The simplest method for this question was to sell the remaining 52 cakes at the cost found in the previous part and add the $200 profit already accounted for. Many candidates

chose to start again and produced a large volume of calculations, most of which repeated earlier work. It would make sense for candidates to consider how many marks a question is worth. This is a one-mark question with a relatively small answer space, so a candidate should not be expecting to complete half a page of calculations and they need to consider if they are doing unnecessary work.

Question 12

The final question on the paper is often the one attempted by the least number of candidates, either due to its difficulty level or time constraints. Over two-thirds of candidates attempted this one. Of the candidates who attempted the question, about a half of them scored some or all marks.

Methods used fell into two main categories, which were trial and improvement methods and algebraic methods.

The candidates using algebraic methods often scored all or no marks as, if they were able to set up the algebra correctly, they were usually able to solve it accurately. Some started to set up algebra for each individual but were unable to connect it together. It is worth reminding candidates that algebra is not essential to answer any question, so substituting a value at this stage would probably have gained them at least one mark for a trial.

Candidates using trial methods scored a range of marks, as sometimes they did not go on to find the final answer.

Barbara walking an additional 10 km was often ignored.

THINKING SKILLS

Paper 9694/21
Critical Thinking

Key messages

Although this exam to some extent tests generic skills, which are developed as by-products of the study of other subjects, it is impossible to perform well without studying the specification, preferably with the aid of the endorsed textbook and with reference to previous question papers and mark schemes. In particular, it is necessary to know such items as reliability criteria, the 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. 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 lot 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) Responses to this question did not access the range of marks available. Most candidates who received credit obtained a mark for pointing out that the information in the first paragraph of Source A did provide support for a claim about 'some people'. A few candidates commented on the significance of the use of 'some'. Other marks were obtained by those who spotted that the claim referred to 'animals', while the evidence was limited to dogs, and by those who recognised that expressing sympathy is not the same as valuing a life.

Many responses merely gave summaries of the source, often quite lengthy ones, but did not give any analysis of it. A number of candidates misread the claim as referring to people in general, rather than 'some people', and erroneously claimed that the evidence undermined it.

(b) The most popular creditworthy answer was the recognition that the source only provided the number of people who donated to each cause, but did not state the total amount of money donated; however, not many candidates gained the second mark available, by drawing the natural inference from this that total donations for the puppy may have yielded a smaller amount of money than that collected for the child. That Source B provided no information about the number of viewings each campaign received was sometimes acknowledged by candidates, although very few went on to explain the significance of this.

A large proportion of candidates claimed that the study was flawed because it had only run for one week, stating that had it been run for a longer period the results may well have been different, and a few also remarked that it was only undertaken in one country. This approach was based on a misunderstanding of the task. Candidates were expected to take Source B *as given*, and to identify and explain one weakness in the support it provides to the claim made in the first sentence of the source. Criticisms of the research methodology of the survey were not relevant to this task.

(c) Most candidates recognised that Source C was not an argument, and gained a mark by also stating either *why* it was not an argument or by stating *what* it was doing instead of arguing. Where they successfully did both of these, they obtained both marks. Many candidates did one or the other, but not both.

Some candidates stated correctly that the source was not an argument, but then went on to state that this was because it does not include a counter-claim, or words to that effect, thereby showing that they were not operating with the correct sense of 'argument'. Such responses did not receive any credit.

(d) Many responses identified the obvious bias in favour of dogs likely to be present among the members of a club for dog owners, although few made any other creditworthy points. A fair-sized proportion of candidates remarked that a claim about 'people in this country' could not be substantiated merely by surveying 800 members of a dog owners' club. This may be true, but the question was explicitly about the reliability of Source D – not about the representativeness of the evidence used, which was how most candidates seem to have viewed it – so this point was not credited.

(e) Overall, this question was well answered. A significant majority of candidates were able to think of at least one plausible reason why people may behave differently in a real-life situation than they said they would when asked by a researcher.

Question 2

Responses were divided fairly evenly between supporting or challenging the stated claim. Perhaps encouraged by the topic, there was a lot more personal thinking than is usually found in responses to **Question 2**. Much of this was both well informed and relevant to the claim.

A typical response featured a conclusion, use of some sources, plus some personal thinking. Candidates usually did not use more than three sources, even though all five were relevant to the claim, so only obtained one of the two marks available for use of sources. There was very little attempt at evaluation, although there were three marks available for this. The most common inferential reasoning used was by candidates who inferred from Source E that it could be used to undermine the research based on the imaginary scenarios cited by some of the other source material.

Some candidates misread the claim 'too much value' as meaning 'so much value', resulting in rather confused arguments.

Section B

Question 3

(a) Overall, this question was answered well. Some candidates lost a mark by including the counter-assertion that precedes the main conclusion. The most popular wrong answers were the last sentences of either the first or the fifth paragraphs.

(b) This question was also answered well. Responses were spread fairly evenly among the four intermediate conclusions present in paragraphs 2 to 3. Unfortunately, many candidates lost marks by including extra material from the passage. In the case of the third and fourth intermediate conclusions, both of which were found in the last sentence of paragraph 3, these were often presented together as a single intermediate conclusion, resulting in the loss of a mark (for the inclusion of an additional element).

(c) Candidates who correctly identified the element usually stated that it was an example, although they sometimes did not gain the second mark because they suggested that it was there to *support* one of the claims in the paragraph. Unusually, the sentence from paragraph 4 cited in the question could legitimately be viewed either as an example or as a piece of evidence. Some candidates did describe it as both and gave a creditworthy account of its function, thereby gaining both marks. The most popular incorrect answer was from candidates who identified it as an appeal to emotion, the purpose of which was to elicit sympathy for the young woman.

(d) Candidates often struggle with questions about unstated assumptions, but quite a few correctly recognised that that rescued walkers must be paying taxes in the country in which they were rescued. Credit was also given to candidates who stated that rescue services must be receiving enough tax revenue to cover the costs of their missions.

Candidates who did not understand what an unstated assumption is often quoted a piece of information from the passage for which no support had been provided. Some candidates identified assumptions that merely related to the background of the passage, rather than the reasoning contained within it; for example, that some walkers need to be rescued, or that helicopters and planes are sometimes used in rescues. This was not what the question was asking them to do, so no credit could be awarded.

Question 4

(a) Very few candidates correctly identified the appeal to tradition. Some candidates stated that there was an appeal to emotion present, and, if they cited a relevant part of the paragraph, they obtained a single mark. Most candidates who did not gain any credit for this question only offered a quotation from the paragraph referring to 'pride' or 'danger'', without explicitly identifying the appeal. Some candidates merely stated there was an appeal to emotion present, but did not explain this attribution.

(b) (i) Most responses credited received their mark for a direct quote of the relevant part of paragraph 3. Candidates, who must have known what the two options were, often confined themselves to giving a critique of the restriction, but without actually answering the question, so could not be given the mark available. Some candidates ignored the wording of the question and claimed that there was a different flaw present (usually, slippery slope).

(ii) Where credit was obtained for this question, it was nearly always for either (a) pointing out that some visitors to mountain areas would not be undertaking any risky activities, and hence would not be deterred from visiting by rescue charges, or (b) acknowledging that while the restriction of options weakened the support for the argument as a whole, the other paragraphs' support was unaffected by the flaw.

(c) There were some good responses to this question. Most of these made the point that the author of the passage was unjustifiably generalising from one particular example, and a few candidates went on to point out that the young woman's behaviour was probably not typical of what people in such extreme danger would actually do.

The most common wrong answer was to identify the paragraph as being undermined by an appeal to emotion, usually sympathy for the young woman and her plight. Some candidates criticised the paragraph for not giving more details about the incident.

(d) A few candidates recognised the significance of 'occasionally', but did not make much use of this. Many summarised the paragraph, while others simply agreed with the response. Overall, this question was not answered well.

Question 5

Challenges to the claim stated in the question outnumbered arguments supporting it. Regardless of which side they took, candidates usually had no trouble in finding a number of separate and relevant reasons to back up their chosen conclusion. The topic may have contributed to this, given the widespread popularity of sport. However, it may also have been a factor in the number of arguments that were dominated by examples from the world of sport – usually professional sport, although the question did not confine itself in this way. Excessive focus on the detail of examples was often to the exclusion of other creditworthy material.

There was some very good hypothetical reasoning provided by candidates. Many candidates made the point that if all dangerous sports were to be banned, then there would be very few sports left to play. Sometimes counter-assertions or counter-arguments were used, but, as implied in the key messages above, these can only be credited when an adequate response is provided, which did not always happen. At times, candidates strayed off the topic slightly, usually by discussing the benefits of sport in general, rather than confining their focus to dangerous sports.

The main reason for most candidates not scoring more than they did, despite the wealth of relevant material that they introduced into their arguments, was that their arguments were fairly simple in structure, often consisting only of reasons plus examples. More specifically, there was very little use made of intermediate conclusions, limiting otherwise cogent and wide-ranging arguments to a maximum of six marks.

Hardly any candidates made the error of using material from the passage.

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, it is impossible to perform well without studying the specification, preferably with the aid of the endorsed textbook and with reference to previous question papers and mark schemes. In particular, it is necessary to know such items as reliability criteria, the 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. 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 **Question 3** and **4**.

General comments

A wide range of performance was observed.

Comments on specific questions

Section A

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

Question 1

(a) Candidates who were familiar with the reliability criteria listed in the specification tended to achieve full or nearly full marks for this question. However, many did not realise that the question was about the reliability criteria; some of these produced perceptive observations, but scored a maximum of 1 mark because they did not specifically attempt what they had been asked to do.

(b) Most candidates claimed that the use of milk substitutes would protect people from the health problems described in the first paragraph of Source B and/or would not prevent them from experiencing the problems identified in the second paragraph. Very few gave the more nuanced answers stated in the mark scheme. As on previous occasions, some candidates were misled by the expression 'reliably…concluded', and discussed the reliability of the source.

(c) A few good answers were offered, but most of the valid observations lacked explanation and therefore received only 1 mark each. Many candidates attempted a different task from the one intended, particularly evaluating the reliability of Source C or criticising its failure to respond to points made in Source B.

(d) Nearly all candidates correctly identified Source D as an argument, and accurately justified their judgment in terms of the technical meaning of that word.

(e) Many candidates gave two acceptable answers to this question, the most popular of which were the reduction in malnutrition and in poverty. Some candidates misunderstood the passage, and wrongly attributed the withdrawal of free milk to older pupils to 'political opposition', while others incorrectly claimed that there had been a substantial increase in lactose intolerance amongst older children; a few even misapplied information from Source A, to claim that it had now been realised that milk was harmful to children over the age of 5.

Question 2

As always, the key to achieving higher marks was to evaluate sources and draw pertinent inferences from them, and on this occasion a good proportion of candidates attempted to do this. There were some good instances of inferential reasoning. 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. 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 relevant comments based on their own knowledge, opinions or experience. However, some candidates relied entirely on their own thinking, making no use of the sources, which severely limited the mark they could achieve.

Section B

Question 3

(a) Most candidates correctly identified the main conclusion, but a few wrong answers were also offered, particularly the whole or the second half of the first sentence of the passage, the last sentence of paragraph 3 and the final sentence of paragraph 5. Some candidates lost a mark by omitting the adverb 'sometimes', which was considered to be significant.

(b) Many candidates correctly identified two intermediate conclusions from the three available, although some of them lost a mark by including an additional argument element in their answers.

(c) Three counter-assertions were available, and a fair proportion of candidates correctly identified one or other of them, but many wrong answers were also offered.

(d) A few candidates offered correct answers to this question. As on previous occasions, many candidates paraphrased or quoted statements from the passage, which by definition could not have been 'unstated assumptions'.

Question 4

As on previous occasions, most candidates achieved lower marks on this part of the exam than on the other sections; however, more candidates than previously seemed to know what some of the questions meant and the kinds of answers which could be correct. Candidates need to understand that arguing against a claim made in the source does not constitute identifying a flaw or weakness in it.

(a) There were many valid ways of explaining what was wrong with the reasoning in paragraph 1, and some candidates succeeded in identifying one or more of them. However, many candidates argued against this part of the reasoning, instead of identifying and explaining a flaw or weakness.

(b) Some candidates recognised that the claim that politicians may need to lie when asked about espionage does not rely on the exaggeration that 'Every nation spies on other countries', but most judged wrongly that the inaccurate generalisation invalidated the claim. Several candidates wrongly claimed that the reasoning was incoherent at this point, since if politicians always denied allegations of spying, the author could not know whether it occurred or not.

(c) Most candidates correctly identified the counter-attack (*tu quoque*) in the final sentence of paragraph 4, but some wrongly located it elsewhere in the paragraph.

(d) A fair number of candidates correctly identified the flaw of personal attack (*ad hominem*) in paragraph 5, but the names of several other flaws in reasoning were also incorrectly offered as answers, while some candidates explained why they disagreed with the reasoning in this paragraph instead of identifying and evaluating a flaw or weakness in it.

Question 5

Candidates engaged well with the claim which they were asked to support or challenge. Some interpreted 'personal relationships' as meaning intimate relationships, while others took a broader view: either approach was acceptable.

A wide variety of standards was achieved. A fair number of answers were well structured, but others consisted of a single stream of consciousness. Many low-scoring answers were brief and undeveloped and some were repetitive and tautologous. Many candidates argued in separate strands of reasoning and a fair number made appropriate use of 'additional argument elements' (examples, evidence, analogies, counters with response or hypothetical reasoning). Although some candidates constructed their strands of reasoning to support intermediate conclusions, relatively few used argument indicator words to identify those intermediate conclusions. Some candidates received relatively low marks for interesting ideas, because they did not 'tick the right boxes', whereas others received higher marks for commonplace content, because they knew what elements to include in order to gain marks. The marks of some answers were capped at 6, because candidates concluded 'I agree with the claim' or similar, instead of arguing in favour of either the claim stated in the question or one of those listed in the mark scheme as acceptable ways of challenging that claim; however, this penalty affected only the relatively few who would otherwise have received a mark higher than 6.

Some candidates claimed to be supporting the claim, but then defended certain exceptions, with the result that they neither supported nor challenged the claim that 'It is always wrong to tell lies in personal relationships.'

THINKING SKILLS

Paper 9694/23
Critical Thinking

Key messages

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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. 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 **Question 3** and **4**.

General comments

A wide range of performance was observed.

Comments on specific questions

Section A

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

Question 1

(a) Candidates who were familiar with the reliability criteria listed in the specification tended to achieve full or nearly full marks for this question. However, many did not realise that the question was about the reliability criteria; some of these produced perceptive observations, but scored a maximum of 1 mark because they did not specifically attempt what they had been asked to do.

(b) Most candidates claimed that the use of milk substitutes would protect people from the health problems described in the first paragraph of Source B and/or would not prevent them from experiencing the problems identified in the second paragraph. Very few gave the more nuanced answers stated in the mark scheme. As on previous occasions, some candidates were misled by the expression 'reliably…concluded', and discussed the reliability of the source.

(c) A few good answers were offered, but most of the valid observations lacked explanation and therefore received only 1 mark each. Many candidates attempted a different task from the one intended, particularly evaluating the reliability of Source C or criticising its failure to respond to points made in Source B.

(d) Nearly all candidates correctly identified Source D as an argument, and accurately justified their judgment in terms of the technical meaning of that word.

(e) Many candidates gave two acceptable answers to this question, the most popular of which were the reduction in malnutrition and in poverty. Some candidates misunderstood the passage, and wrongly attributed the withdrawal of free milk to older pupils to 'political opposition', while others incorrectly claimed that there had been a substantial increase in lactose intolerance amongst older children; a few even misapplied information from Source A, to claim that it had now been realised that milk was harmful to children over the age of 5.

Question 2

As always, the key to achieving higher marks was to evaluate sources and draw pertinent inferences from them, and on this occasion a good proportion of candidates attempted to do this. There were some good instances of inferential reasoning. 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. 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 relevant comments based on their own knowledge, opinions or experience. However, some candidates relied entirely on their own thinking, making no use of the sources, which severely limited the mark they could achieve.

Section B

Question 3

(a) Most candidates correctly identified the main conclusion, but a few wrong answers were also offered, particularly the whole or the second half of the first sentence of the passage, the last sentence of paragraph 3 and the final sentence of paragraph 5. Some candidates lost a mark by omitting the adverb 'sometimes', which was considered to be significant.

(b) Many candidates correctly identified two intermediate conclusions from the three available, although some of them lost a mark by including an additional argument element in their answers.

(c) Three counter-assertions were available, and a fair proportion of candidates correctly identified one or other of them, but many wrong answers were also offered.

(d) A few candidates offered correct answers to this question. As on previous occasions, many candidates paraphrased or quoted statements from the passage, which by definition could not have been 'unstated assumptions'.

Question 4

As on previous occasions, most candidates achieved lower marks on this part of the exam than on the other sections; however, more candidates than previously seemed to know what some of the questions meant and the kinds of answers which could be correct. Candidates need to understand that arguing against a claim made in the source does not constitute identifying a flaw or weakness in it.

(a) There were many valid ways of explaining what was wrong with the reasoning in paragraph 1, and some candidates succeeded in identifying one or more of them. However, many candidates argued against this part of the reasoning, instead of identifying and explaining a flaw or weakness.

(b) Some candidates recognised that the claim that politicians may need to lie when asked about espionage does not rely on the exaggeration that 'Every nation spies on other countries', but most judged wrongly that the inaccurate generalisation invalidated the claim. Several candidates wrongly claimed that the reasoning was incoherent at this point, since if politicians always denied allegations of spying, the author could not know whether it occurred or not.

(c) Most candidates correctly identified the counter-attack (*tu quoque*) in the final sentence of paragraph 4, but some wrongly located it elsewhere in the paragraph.

(d) A fair number of candidates correctly identified the flaw of personal attack (*ad hominem*) in paragraph 5, but the names of several other flaws in reasoning were also incorrectly offered as answers, while some candidates explained why they disagreed with the reasoning in this paragraph instead of identifying and evaluating a flaw or weakness in it.

Question 5

Candidates engaged well with the claim which they were asked to support or challenge. Some interpreted 'personal relationships' as meaning intimate relationships, while others took a broader view: either approach was acceptable.

A wide variety of standards was achieved. A fair number of answers were well structured, but others consisted of a single stream of consciousness. Many low-scoring answers were brief and undeveloped and some were repetitive and tautologous. Many candidates argued in separate strands of reasoning and a fair number made appropriate use of 'additional argument elements' (examples, evidence, analogies, counters with response or hypothetical reasoning). Although some candidates constructed their strands of reasoning to support intermediate conclusions, relatively few used argument indicator words to identify those intermediate conclusions. Some candidates received relatively low marks for interesting ideas, because they did not 'tick the right boxes', whereas others received higher marks for commonplace content, because they knew what elements to include in order to gain marks. The marks of some answers were capped at 6, because candidates concluded 'I agree with the claim' or similar, instead of arguing in favour of either the claim stated in the question or one of those listed in the mark scheme as acceptable ways of challenging that claim; however, this penalty affected only the relatively few who would otherwise have received a mark higher than 6.

Some candidates claimed to be supporting the claim, but then defended certain exceptions, with the result that they neither supported nor challenged the claim that 'It is always wrong to tell lies in personal relationships.'

THINKING SKILLS

Paper 9694/31
Problem Analysis and Solution

Key messages

Candidates should be aware of the distinction between logical deduction (using true and false) and statistical inference from evidence.

For questions involving numbers, candidates should be clear as to whether they are working with discrete values (generally whole numbers) or (continuous) real numbers.

Candidates should not conflate estimation with approximation.

General comments

Most candidates attempted all parts of all questions. A few did not complete the last one attempted.

When an example is asked for it is advisable to give just one.

Any handwritten underlining should be applied with care so that, e.g. E and F can be distinguished.

Times were generally well-handled, with very few examples of 100-minute hours.

Numeric working was generally shown, but many would benefit from explicit indication of the units, not least to spot errors. The paper's title ('Analysis and Solution') should be a reminder that the Answer booklet is for more than just final answers.

Comments on specific questions

Question 1

(a) Many candidates did not split off the number from the recent **B** visit, and a few rounded down instead of up.

(b) Most candidates identified the correct three options. A few did not notice that there were not enough spaces left at **D** or **G**.

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Question 2

(a) Most candidates gave the winner and indicated that the number of fails was the reason. Since this answer could not be deduced from the question without reference to the context (i.e. not simply 'X won because X had most points') credit was given for noting it was fewer fails without giving the numbers, but it is good practice to include the specific figures for the case in question.

(b) Most candidates gave a fully correct example. The most common error was to omit the 5.8 column.

(c) Most candidates gave the five names in the correct order; a few added a sixth.

(d) Most candidates correctly determined the heights, but some made 'all his possible total numbers of fails' into 'the number of different possible total numbers of fails'. Many just gave one example, but the question asked for all cases to be identified.

(e) Fewer candidates correctly answered this than did **2(d)**, generally by being one 0.2 m unit out at, at least one end. Some interpreted 'could have been' not as restricted to being the maximum consistent with the data given, but as a maximum so that it was likely that not all competitors would fail.

(f) Most candidates gave the names in order and gave the correct justification, which was explicitly needed for full marks. Some offered two names for first, a second, and also two thirds.

Question 3

(a) (i) Most candidates offered the correct total.

(ii) A wide variety of answers was given, often with no explanation, although some had not thought that the same bird could be in the area at more than one time.

(b) Most candidates noted that some birds might be counted more than once, and a few identified the scenario at 11:02 as critical, but very few found the possible $5 + 5 + 5$ split.

(c) This part essentially called for the maximum over the rows of the second largest value in the row. Candidates might well be able to do that mentally, and no working was explicitly required, but without working we cannot be certain where the various wrong answers came from.

(d) Although many responded, very few candidates correctly answered either part. The question sought 'how to deduce', i.e. use logical deduction, yet many responses offered comments about likelihood. Insights such as 'the one with the binoculars will count more than average' and 'the one who includes swallows will count more than average' were not profitable with this small data set.

Question 4

(a) Most candidates correctly added the figures and added 20 per cent. A few showed the correct answer but had used a less efficient calculation: adding the 20 per cent separately.

(b) Most candidates saw that the greatest profit was when there was not a manufacturing error, and the least when there was an error. The longer calculation of the latter came with more arithmetic errors by candidates.

(c) Many candidates wrote out the times as shown in the mark scheme, leading to the correct answer. Those attempting an algebraic formulation were generally unsuccessful.

(d) Many candidates ignored the requirement to start a new puzzle if finished before 17:00. The 2 marks available should have been an indicator that more than one step was needed.

(e) Some candidates used a correct but inefficient method of calculation, involving total income minus total costs, but made arithmetic errors and so did not get the correct final answers.

(f) Very few candidates calculated the new rate correctly. A few simply lamented that the old rate of pay was unfair. One candidate appeared to have done the work somewhere else, but then made a transcription error, offering $15 375 rather than $16 375, and likely missing the opportunity for at least 3 more marks.

THINKING SKILLS

Paper 9694/32
Problem Analysis and Solution

Key messages

Candidates should be aware of the distinction between logical deduction (using true and false) and statistical inference from evidence.

For questions involving numbers, candidates should be clear as to whether they are working with discrete values (generally whole numbers) or (continuous) real numbers.

Candidates should not conflate estimation with approximation.

General comments

Most candidates attempted all parts of all questions. A few did not complete the last one attempted.

When an example is asked for it is advisable to give just one.

Any handwritten underlining should be applied with care so that, e.g. E and F can be distinguished.

Times were generally well-handled, with very few examples of 100-minute hours.

Numeric working was generally shown, but many would benefit from explicit indication of the units, not least to spot errors. The paper's title ('Analysis and Solution') should be a reminder that the Answer booklet is for more than just final answers.

Comments on specific questions

Question 1

(a) Many candidates did not split off the number from the recent **B** visit, and a few rounded down instead of up.

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THINKING SKILLS

Paper 9694/41
Applied Reasoning

Key Messages

- In **Question 1**, candidates are expected to quote directly from the text in the document.
- 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 of 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 **Question 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**. A minority of candidates wrote disproportionately long answers for the earlier, lower-tariff questions.

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

Comments on specific questions

Question 1

All parts of **Question 1** rewarded the well-prepared candidate. Those who knew what was expected and attempted to analyse the argument usually gained between 3 and 6 of the 8 marks for analysis. Some candidates were unaware that quoting from the text is necessary for answering this question.

(a) Most candidates knew what was required and attempted to identify the conclusion. Around a third of the answers were correct. A variety of incorrect suggestions for the main conclusion were seen. A minority of candidates offered a paraphrase of the correct answer or gave the gist of the argument.

(b) Most candidates gained 1 mark here and many achieved 2. A lot of candidates offered the whole of the final sentence in paragraph 2 as an answer – *Greece is no longer part of the British Empire so any Greek artefacts in Britain should be returned to Greece.* – rather than just the part that was the conclusion – *any Greek artefacts in Britain should be returned to Greece*. Most candidates followed the instruction to give only two answers. Interestingly, some candidates who gave paraphrased answers in **part (a)** went on to state precise and correct answers in **part (b)**.

(c) Around a third of candidates achieved a mark here. Many candidates omitted either the reason or the conclusion from their answer, so offering a counter assertion, rather than a counter argument. Some answers included the response to the counter assertion as part of their answer.

(d) Although many candidates knew what was expected in this question, some still did not understand what was required. 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 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 identified an individual argument element as 'reasoning' (as opposed to 'a reason', which might have been creditworthy). It was relatively common for well-prepared candidates to be awarded award 2 marks and full marks was seen occasionally.

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 do not know the source' (although there were fewer of these this session). Many candidates scored 0 but many were able to successfully identify weaknesses. Marks were most commonly gained for identifying the inconsistency in paragraph 4 and the personal attack (*ad hominem*) in paragraph 6. A number of candidates suggested that the legality of the Marbles' removal was an area of ambiguity and hence a flaw in the reasoning. However, any apparent contradiction in this area was between Document 1 and Document 2, and not within Document 1, so such suggestions were not credited. Many candidates identified stated claims as unstated assumptions and were not credited.

(b) Most candidates attempted to do what was required for this question. Some answers gained one or two marks, more often from the first paragraph of the mark scheme, but occasionally from the second. The last two points on the mark scheme were not addressed.

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) The majority of candidates achieved at least one mark and a large number got both. The third point on the mark scheme was seen only once.

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Question 4

Candidates were required to use the documents to construct a reasoned case to support or challenge the conclusion that 'Culturally significant artifacts should be returned to their country of origin'. Most candidates were able to engage with this topic and attempted to construct their own arguments, with few relying on sequentially summarising the documents. Some candidates were able to arrange their ideas into strands of reasoning that each supported a clear intermediate conclusion and, hence, scored higher than level 1 for the structure skill. However, few candidates were using the documents with a critical eye, which meant the marks for 'use of documents' were often restricted to level 1. Some 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, one could question the implication in Document 2 that because the Marbles might have been in historical danger in their original position, they would still be in danger in a modern Athens, or that the mention of Athenian pollution in Document 2 is a straw man that could easily be burned by the Marbles' being housed in appropriate conditions in a museum.

Arguments both for and against the conclusion were strengthened by effectively responding to a range of potential counter-positions. 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 relevant alternative viewpoints.

THINKING SKILLS

Paper 9694/42
Applied Reasoning

Key Messages

- In **Question 1**, candidates are expected to quote directly from the text in the document.
- 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 of 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 **Question 2** and **3**, can be valid ways of strengthening an argument.

General comments

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(c) Around a third of candidates achieved a mark here. Many candidates omitted either the reason or the conclusion from their answer, so offering a counter assertion, rather than a counter argument. Some answers included the response to the counter assertion as part of their answer.

(d) Although many candidates knew what was expected in this question, some still did not understand what was required. 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 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 identified an individual argument element as 'reasoning' (as opposed to 'a reason', which might have been creditworthy). It was relatively common for well-prepared candidates to be awarded award 2 marks and full marks was seen occasionally.

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 do not know the source' (although there were fewer of these this session). Many candidates scored 0 but many were able to successfully identify weaknesses. Marks were most commonly gained for identifying the inconsistency in paragraph 4 and the personal attack (*ad hominem*) in paragraph 6. A number of candidates suggested that the legality of the Marbles' removal was an area of ambiguity and hence a flaw in the reasoning. However, any apparent contradiction in this area was between Document 1 and Document 2, and not within Document 1, so such suggestions were not credited. Many candidates identified stated claims as unstated assumptions and were not credited.

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THINKING SKILLS

Paper 9694/43
Applied Reasoning

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