

THINKING SKILLS

Paper 9694/11 Problem Solving
--

Key messages

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

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

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

When an explanation is asked for in a question where numbers are involved, as is 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

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

Most candidates realised that Jane needed to arrive at the airport by 15:30 at the latest and that to achieve this she needed to catch a train by 14:45. Since the trains run at 20 and 50 minutes past each hour, the 14:20 was the latest train that Jane could catch. The most common incorrect answer was 13:50, which was a possible train, but not the latest one. A minority of candidates wasted time by writing down all the times of the trains from 05:20 onwards.

Question 2

- (a) Just under half of the candidates gave the correct answer of \$16.90, by working out the cheapest way to buy each of 10 muffins and 10 cupcakes. Almost all candidates found the correct cheapest cost of 10 cupcakes as \$7.70. A commonly seen answer for the cost of 10 muffins was \$9.60, coming from one pack of 4 with six singles. They could be bought more cheaply as two packs of 4 with two singles.
- (b) The least possible amount that Keira needs to pay for 18 cakes, with at least 9 cupcakes and at least 7 muffins, comes from buying 10 cupcakes and 8 muffins. A common error was to assume equal numbers of cupcakes and muffins.
- (c) (i) Most candidates reasoned this correctly: the greatest profit is when all the muffins are sold individually at \$1 each and is equal to \$0.40 per muffin.

- (ii) Around 40 per cent of candidates reasoned that the least profit is when all the muffins are sold in packs of 4.

Question 3

There are three stages to solving this problem: finding the area to be painted, finding how many cans of paint are required and then calculating the least cost of this paint. The majority of candidates knew what they needed to do, but less than half obtained the correct final answer. There were two common errors in finding the area to be painted. Some candidates found the correct expression for the area as $6^2 - 2 \times 3$ but simplified this to $12 - 6 = 6$. Others used the differences between the perimeters of the wall and the board instead of the difference in the areas. Having found the correct area, some candidates then divided by 2.5 instead of 2.8 to find the number of cans of paint. Of those candidates who correctly found that 11 litres of paint would be required, some then did not find the least cost, choosing instead to use 11 one-litre cans.

Question 4

- (a) The majority of candidates calculated the total number of points awarded in 8 rounds (36), and then subtracted the 19 points that Harriet had scored to leave 17 points scored by Kevin.
- (b) The majority of candidates obtained the correct answer of 3.
- (c) This part proved to be quite challenging, with less than one-third of candidates earning any marks. The key was to realise how to allocate the remaining three scores: 9, 10 and 11, so that the difference in the final scores of Harriet and Kevin would be a minimum. This is achieved by pairing the 11 with the 19 and the 9 and 10 with the 17, giving final totals of 30 and 36, a difference of 6.

Question 5

Candidates found this question challenging and only 25 per cent scored full marks. A good number of candidates were able to make a start by calculating the income from the lowest priced tickets. This gives subtotals of \$400, \$1500, \$3500 and \$6400 for the \$20, \$50, \$70 and \$80 tickets respectively, and a total of \$11 800. The next group of tickets gives an income of \$9000, and a cumulative total of \$20 800, which is greater than the \$20 000 in the question. Most candidates were not able to deduce from either \$11 800 or \$20 800 that 92 tickets needed to be sold at \$90.

Question 6

Just over half of the candidates scored both marks on this question. Others identified Light as the correct song, without specifying how the notes must be moved.

Question 7

Almost all the candidates approached this question with confidence, engaging with the scenario. However, there were various errors in understanding or calculation along the way and less than 30 per cent scored full marks.

- (a) In this part, candidates were required to calculate and compare the costs for Mo and Harry's stay at two hotels, the Argyle and the Banton. A very common error was to calculate the costs for only one person, ignoring the second sentence of the stem which states that the charges in the table are 'per person'. Consequently, a common answer was 'Banton is cheaper by \$27.50'. This scored one of the two available marks.
- (b) In this part, most candidates understood the nature of the special offers and correctly deduced that the least cost would be obtained by considering Flo's six-night stay as a 2-night stay and a 4-night stay. This leads to a 10 per cent discount on the 2-night stay and a 25 per cent discount on the 4-night stay. However, the majority of candidates then made the mathematical error of stating that this was the same as a 35 per cent discount for a 6-night stay.

Other candidates considered the 6-nights as two sets of 3-nights and obtained a sub-optimal total cost. A few candidates combined this error with the incorrect method for percentages, stating that a 15 per cent discount for each of the 3-nights was equivalent to a 30 per cent for a 6-night stay.

- (c) Again, in this part, similar errors in calculating the percentage discounts were employed. Most candidates did however calculate the correct cost for the Saturday night stay and scored one mark.

Question 8

- (a) The majority of candidates successfully applied the 'four for the price of three' offer and calculated the correct least cost of 14 costumes.
- (b) About half of the candidates identified that the least cost would occur when 8 blue costumes (and therefore 6 white costumes) were bought, and then calculated the correct value. Other candidates had other combinations of numbers of blue costumes and white costumes and thereby calculated a cost that was not the minimum. These sub-optimal answers were awarded one mark.
- (c) This part was more challenging and only a minority of candidates made any progress in their solution.

Question 9

- (a) The majority of candidates did not engage in a meaningful way with this problem. The key fact is that the total points scored by any team must be a sum of multiples of 7 and 5 since the only way of scoring points is with a *snootch* (7 points) or a *coff* (5 points). Checking the given totals leads to the conclusion that 23 is the only one that is not a sum of a multiple of 7 and a multiple of 5. The vast majority of incorrect answers appeared without any context and seemed to be guesses.
- (b) The key fact in this part is that the total number of points scored must be the same as the total number of points conceded. These totals are 287 and 288 respectively, so having identified 23 as the incorrect entry in the table, it can be deduced that its correct value must be 24 to balance the two totals. As a check, 24 is two 7s plus two 5s so fulfils the criterion used in **part (a)**. Only a small minority of candidates gained any marks in this part.

Question 10

A quarter of the candidates answered this question correctly while a further quarter did not make any attempt. The remaining candidates made some progress, usually by identifying that there must be at least 60 guests so that store A is cheaper than store B or store C. This was usually then followed by an incomplete search to determine the number of purchases that would ensure that store A is cheaper than store D.

Question 11

This question was found to be the most challenging on the paper with few fully correct answers.

- (a) Most candidates who scored on this part showed that if Max used a \$1 coin then he would receive five coins in his change and therefore would have ten coins in total. For a full explanation it was necessary to show also that Max could not have paid with either four 5 cent coins or with one 25 cent coin.
- (b) Only a handful of candidates made any progress in this part, with half making no attempt.

Question 12

- (a) About one-third of the candidates realised that subtracting the two given combinations of tea, coffee and cake would result in the cost of one coffee and one cake.
- (b) There are several ways of combining the given information to answer this part of the question. The minority of candidates who attempted it did so by first deducing that the cost of one tea and one coffee was the difference between \$10 and their answer to **part (a)**. The required answer was found by adding twice this amount to the given \$15.75.

Question 13

Almost half of the candidates made no attempt at this problem. It was not possible to tell whether this was because they did not know how to approach it or because they had run out of time. A correct solution required a systematic approach with a time schedule detailing which friend was exercising on which machine

and when. Credit was given to solutions which showed a good attempt at such a schedule, even if the final answer was incorrect. The most common answer was 32 minutes, coming from the fact that each of the four friends exercised for 32 minutes in total, but failing to engage with the fact that Abigail's timings would not allow this possibility.

THINKING SKILLS

Paper 9694/12 Problem Solving
--

Key messages

- Working should be clear and logical and inside the working space provided wherever possible. Calculations were often seen outside of the lined working space for the questions and the lined space was often almost unused. It was sometimes difficult to determine what the candidate's final answer was.
- Candidates need to read the questions carefully before answering, and again after, to make sure they have done what is requested of them. Information given in the questions generally needs to be used in order to answer fully. Lack of care in reading, or not using, the information given was particularly noticeable in **Questions 3, 7b, 8, and 9**.

General comments

The scores seen covered the whole range from almost zero to almost full marks and the more able candidates were able to attempt most of the questions and achieve very good marks.

Most candidates were able to engage with at least some of the questions. Many of the lower scoring candidates do not seem to have attempted most of the paper.

Comments on specific questions

Question 1

- (a) Most candidates attempted this question, with over three quarters of them answering successfully. The most common incorrect method seen was to reverse the division and divide the original value by the new value, e.g. for Primary, 9 million divided by 12 million, which led to an incorrect answer of secondary with an 80 per cent increase.
- (b) This question was attempted by about 90 per cent of the candidates, and those who did attempt it generally scored 0 or 2 marks. A significant number of candidates understood the principle of the question but were either careless with their calculations or only found the increase each sector received and did not answer the question asked, which was to find the amount received in 2020. Another common error was to work with the proportions from 2010 rather than 2000.

Question 2

- (a) The majority of candidates answered this question correctly. The most common method used was listing the possible combinations. Untidy working led to some candidates miscounting and spoiling their answer. A small number listed the combinations correctly but did not give 9 as their final answer. Amongst those who did not score, a common error was to list the combinations for the blue and brown shirts and white hat, rather than for all the shirts, leading to some omissions and duplication of combinations.
- (b) Most candidates answered this question correctly, with only about 10 per cent not scoring. The most common misunderstanding was to give the answer as the red or brown hat, as they could be worn with the most shirts, rather than the white hat, which could be worn with the least.

Question 3

- (a) (i) The majority of candidates answered this question well, with over three-quarters achieving full marks. The majority of candidates listed the times batches of toast were finished, added up the number of slices this would give and found the difference. Candidates who failed to score had often not read the question carefully enough and had not recognised that two slices of toast were made at a time and worked in batches instead, leading to the incorrect answer of 2. Some candidates had found how many slices of each type of toast could be made but did not go on to work out the difference between them. A number of candidates ignored the reduction in time after the first batch and just worked with the initial times taken throughout.
- (ii) Less than half of the candidates answered this question correctly. There were a number of errors seen. The most common error was that candidates did not realise the toaster did not need to warm up again between doing the two varieties of toast, so gave an answer 1 minute later than the correct answer. A significant number of candidates had worked out that the toasting would take 16 minutes to complete but gave this as a final answer rather than giving it as a time after 7.00 am, as requested in the question. As in **part (a)(i)**, a number of candidates did not take into account that two slices of toast could be made at a time, and made six batches of each variety rather than three.
- (b) The majority of candidates did not score on this question. Candidates often did not realise that the two toasters could be used for both varieties of toast so used one to make all the white toast and the other to make all the brown toast. This led to answers of 07:07 for the white and 07:10 for the brown. As in **part (a)(ii)**, a number of candidates gave their answer as the number of minutes it took to toast rather than as the time completed as requested.

Question 4

- (a) Just over a half of candidates answered this question correctly. Many of the responses were untidy and candidates were unable to follow their own work, leading to errors. The most successful candidates used a flow diagram type of method, listing the start and end time of each of the tasks and adding them individually. Candidates who tried to add the duration of the tasks first often made errors, particularly with the number of breaks required. A small number of candidates added an additional break at the end of completing all the tasks.
- (b) Only about a third of candidates scored full marks with approximately a further third scoring no marks at all. The question was not particularly difficult, but limited working by the candidates made it difficult to award part marks. A plan showing the times and tasks was the most sensible way to tackle this question and would allow part marks to be awarded if the correct answer was not reached, but often times were dotted about the page with no indication of what days or tasks they referred to. Common errors were to not complete the report prior going to cricket on Saturday and adding an extra break in after arriving back from cricket.

Question 5

- (a) The majority of candidates answered this question correctly. Most candidates started by removing the cost of the small cups and using trial and error to find the number of medium and large cups that would give them the remaining cost. Candidates scoring one mark often did not go beyond removing the cost of the small cups or did not give the number of both large and medium cups. Candidates scoring no marks often made errors in calculation very early in the process and did not successfully complete any part of the problem.
- (b) This question was tackled in a similar way to **part (a)**. Fewer candidates achieved full marks on this one, as the question asked for *all* the possibilities and some stopped after finding one solution. A number of candidates did not go beyond the step of removing the cost of the small cups on this part of the question.

Question 6

Candidates found this question one of the more challenging on the paper and there were common errors throughout all sections of the question. Instead of producing six digits that read the same backwards as forwards, candidates often read in pairs of digits, e.g. 20 06 20. Many were able to find a date that would read the same backwards as forwards but it was either a date prior to 1 June 2020 or was not the next date after 1 June 2020.

- (a) Just over half of the candidates answered this question correctly. 20 06 20 was the common incorrect answer.
- (b) Under half answered this question correctly. Candidates struggled to find the next date after 1 June 2020.
- (c) This part of the question was found to be the most challenging, with only a minority of the candidates scoring. Again, whilst many candidates were able to find *an* ambiguous date, they were not able to find the next one after 1 June 2020. Some candidates scored only one mark as they left their answer in digits which, as it was an ambiguous date, was unclear what their intended final answer would be.

Question 7

- (a) This question was generally answered well, with most candidates understanding what the question wanted of them. The majority of candidates scored two or one marks. Many did the work but only scored one of the two available marks, as they did not state the smallest number of boxes needed, as the question required. Untidy layout of work made it impossible in some cases to decide what the candidate's answer was, with trials scattered all over the working area.
- (b) This question was answered less well, with most candidates scoring either two or zero marks. Many candidates who did not score appeared to understand what the question was asking them and gave one possible way the cakes could be packed; however, the question states twice that there were three ways in which it could be done and no attempt was made to find the additional ways.

Question 8

Many candidates found this question challenging with about half scoring on **part (a)** and less than half scoring on **part (b)**. To make progress on both parts, candidates needed to work out the total weight of the two 50¢ and two 20¢ coins saved daily and subtract from the 900g total weight. A surprisingly large number of candidates either ignored these coins altogether and worked with the 900g or ignored the 30 days and only subtracted one lot of these coins' weight.

- (a) Most candidates attempted this question and about a quarter of candidates were able to answer it correctly. Once the initial stage mentioned above was managed, many candidates were unsure of how to proceed and, rather than recognising the minimum amount would be made up of as many 20¢ coins as possible, they tried a combination of both coins which led to a multitude of incorrect answers.
- (b) After finding **part (a)** a challenge, about a fifth of candidates did not attempt **part (b)**. Similar problems were encountered, although a number who had been unable to complete the first stage were able to obtain a mark for recognising that as many 50¢ coins as possible were required.

Question 9

Candidates also found this question a challenge, with less than half of the candidates scoring. The most common incorrect answer was 36, which usually came from dividing the total saving of \$72 by the \$2 discount per box of paper. Trial and improvement methods were seen frequently; however, they rarely made progress, because the additional box that had to be purchased to receive the discount was ignored and the trials were looking at the same number of boxes for \$8 and \$6 each, leading again to the incorrect 36. The use of algebra was seen occasionally but rarely correctly, as the additional box needing to be purchased was ignored in its setting up.

Question 10

This question tested the candidates. Whilst about a quarter of the candidates answered the question fully correctly, about half scored 0, and a further 15 per cent did not attempt it. Many candidates did not work with speed at all in their calculations but instead found the travel time of the downhill tram and reduced this time by 20 per cent, coming to the incorrect answer of 14.4 minutes. Some candidates, realising the uphill tram was slower so should take longer, added the 20 per cent found instead, giving an answer of 21.6 minutes.

Few candidates scored part marks, as the candidates who started to work with speed generally went on to answer the question correctly.

Question 11

No part of **Question 11** was answered well, with over half the candidates scoring no marks in any part.

- (a) About 40 per cent of candidates scored on this part of the question. Many candidates appeared not to understand the phrase 'knockout stage' and included this as an additional game that had to be played. Many candidates also thought the winning team would have to play six games in the league stage of the tournament, rather than 5. The most successful candidates often drew themselves a simple visual aid to help them work out the number of games played in the league stage.
- (b) About two thirds of the candidates either scored no marks or did not attempt to answer this question. Candidates confused about the knockout stage in the previous part of the question, generally made the same mistake again, but that did not stop them from obtaining a mark for the total number of games played in the league. Common errors included: only counting the games played in one of the leagues, and not all 4; and double counting the league games by assuming 6 teams played 5 games each. A number of candidates gave what appeared to be a random number as an answer with no working shown at all.
- (c) This part of the question was the most challenging for candidates, with about a third not attempting it and over half scoring zero marks. Working was generally poorly laid out and very few candidates used any sort of system to bringing in their reserve players. The most successful candidates laid out their working logically and showed the players being switched out in order rather than random replacement. The most sophisticated method used was to recognise that all nine players need to be able to be replaced in a five-match cycle, so dividing the nine players by five means two reserve players are needed.

Question 12

This was the final question on the paper; some candidates appeared to be running short of time and did not attempt the questions, whilst others gave what looked to be rushed answers with no working to support them. As you would expect from a final question, this was challenging; however, had candidates drawn a timeline showing the periods of time the offices were open in London time, all three parts of (a) could have been answered relatively easily.

- (a) (i) About a third of the candidates answered this question correctly, with the remainder either scoring zero marks or not attempting the question. The candidates who showed a method usually wrote a list of opening and closing times, often next to the table, and were then able to find the correct answer easily. Some candidates attempted to use the time differences and the 8 hours opening times to reach a 24 hr difference, with varying success.
 - (ii) Only a minority of candidates were able to answer this question successfully. Although some candidates had managed to correctly convert all of the opening and closing times to London time, it was difficult to pick out the time when only one office was open without showing them on a timeline.
 - (iii) Candidates faced the same difficulties that they had in **part (a)(ii)** when looking at lists of times. Over a third of candidates did not attempt this question.
- (b) As the very last question on the paper, almost half did not attempt this question. Quite a lot of answers looked like guesses as they were not supported by any working. The more mathematically sophisticated candidates realised that the only two offices that needed to be considered were the ones furthest ahead (Auckland) and furthest behind (Vancouver) London time. The candidates that selected these two offices generally scored at least one of the two available marks.

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 partial marks are available for intermediate steps in the working, even though the final answer may be incorrect.

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

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

When an explanation is asked for in a question where numbers are involved, as is 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

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 many of the questions in a meaningful way.

Comments on specific questions

Question 1

All candidates who attempted this question scored full marks in both parts. The remaining candidates did not make any attempt at answering the question.

Question 2

From the two pieces of information given, it can be deduced that one ball of yarn is sufficient for one metre of scarf, so 4.75 metres of scarf can be knitted from 5 balls of yarn. A minority of candidates argued, incorrectly, that because 2 balls were needed for 1.5 m and 3 balls for 3 m, then 5 balls would be needed for 4.5 m of scarf. Since $4.75 > 4.5$, a sixth ball of yarn would be required.

Question 3

This question was found to be quite challenging. One-third of the candidates scored full marks. The key was to draw a vertical line from any point on the top of the grid so that it would hit an island. This would be followed by continuing this line in a horizontal line to the left. If this continuation did not hit an island then the point on the island was a possible point for the treasure. All such points were required. It was clear that most candidates had some idea of what to do, but many missed some or all of the precise areas of coastline required.

Question 4

- (a) (i) and (ii) All candidates scored full marks in these parts, selecting the correct classes at the correct times.
- (b) Most candidates considered this change to the scenario and showed that Annabel would spend 1 hour 40 minutes at Shane's gym. Some candidates omitted to compare this with the earlier time of 2 hours, from which Annabel could conclude that she would spend less time at the gym.
- (c) This part was answered correctly by all candidates.
- (d) (i) All candidates argued that if Charlie attended the earliest Zumba class after her arrival and then the earliest possible Spin class, then it would then be 14:40. Since the latest Pilates class starts at 14:30, Charlie cannot attend it.
- (ii) The majority of candidates negotiated a different route through the three classes and found the least time that Charlie would be at the gym.

Question 5

- (a) Most candidates realised that the cheapest amount would be paid by using offer Z twice, pairing each of the two more expensive books with one of the two less expensive books and thereby paying only \$11 for each of the more expensive books.
- (b) This was answered correctly by all candidates.
- (c) Although it is possible to deduce the costs from the given information directly, most candidates formed three simultaneous equations and solved them to find the costs of the three games.

Question 6

The majority of candidates scored full marks on this question. The common approach was to calculate that Clive requires 26 litres of red paint if he decides to mix paint to produce orange and pink. This is 16 litres more than the 10 litres that he would use without the special offer. This is equivalent to 8 tins, on each of which there is a saving of \$3, so \$24 in total.

Question 7

- (a) All candidates answered this part correctly, noticing that the drop in price occurred on Thursday of Week 1.
- (b) Just under half of the candidates either omitted this part or gave the answer as \$2.90. The latter assumes that there were no offers in place on Monday of Week 2, whereas the information from Wednesday of Week 2 tells us that the crisp offer was in place that day but could not have been on the following Thursday and Friday. Therefore, the crisp offer was in place on Monday of Week 2, and so the full price would have been \$2.90 + \$0.20.

Question 8

- (a) The correct answer for the largest possible score is when each colour ball is hit in one turn. Some candidates did not apply the rules correctly and thought that the black ball, with 7 points, could be hit 7 times.
- (b) Most candidates answered this correctly by listing the five combinations of the three different numbers from 1 to 7 that give a total of 12.
- (c) Most candidates deduced that the two possible totals with a difference of 11 were 6 (1, 2, 3) and 17 (4, 6, 7).

Question 9

- (a) The majority of candidates answered this part correctly. The cheapest way to buy 5 litres of water is to buy 5 1-litre bottles, with the special offer implying that one of the five would be free.
- (b) All candidates found a possible cost of exactly 15 litres of water, but it was not always the least cost.
- (c) The majority of candidates realised that the cost of 15 litres of water could be lowered by buying 16 litres in 2-litre bottles.

Question 10

- (a) Most candidates answered this correctly by working out that the 07:00 bus from Garton became the 08:40 from Hendy and then the 10:00 from Garton.
- (b) The majority of candidates answered this correctly. The 07:00 bus from Garton will leave again every three hours, at 10:00, 13:00, 16:00, 19:00 and 22:00, so six times in all. Some candidates did not include the final journey.
- (c) The 08:40 bus from Hendy will arrive at Garton at 09:55 and so will pass the five buses that are travelling in the opposite direction between those two times. 60 per cent of the candidates worked this out correctly. The remaining candidates missed one or more of the relevant buses.
- (d) Less than half of the candidates obtained the correct answer for the number of buses required. There was no common incorrect answer. There are several ways of solving this problem, but perhaps the simplest is to extend from **part (b)** where it was found that the complete cycle of buses is three hours and that six buses are required to fulfil the timetable.

Question 11

This question was found to be the most challenging on the paper.

- (a) Just under 50 per cent of the candidates gave the correct answer of 32. The remaining candidates either omitted this part or gave an incomplete list of possible 5-digit codes.
- (b) The common approach in this part was to consider separately codes which had 1, 2, 3, 4, and 5 digits. Candidates often made slips along the way.
- (c) Any plausible reason was acceptable in this part. The most common answer was that there are more 3-digit and 4-digit codes than there are 5-digit codes, so guessing the correct code would be more difficult.

Question 12

Candidates performed well on this question.

- (a) The majority of candidates used algebra to solve this problem, setting up a linear equation and solving it. It is equally possible to use a deductive approach, without algebra, but the two methods are essentially the same.
- (b) Candidates used a similar approach as in **part (a)**. Many were successful.

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 in the exam without studying the specification, preferably with the aid of the endorsed textbook and with reference to previous question papers and mark schemes. In particular, it is necessary to know such items as reliability criteria, the meaning of the expressions 'argument', 'argument element' and 'analogy' and the names of certain flaws and weaknesses in reasoning.

General comments

This was the second year and third session in which the new specification and the new format for the exam were tested. This paper in the November session has always attracted a significant proportion of candidates who fell far short of any plausible pass mark, apparently because they did not know what they were expected to do in response to the various types of question, but there were more of such candidates this year than usual.

A significant number of candidates omitted at least one question, especially **Questions 3(c), 3(d)** and all parts of **Question 4**; this was most probably because they thought there was no point in attempting a task if they had no idea what they were being asked to do, although that does not explain why some omitted **Questions 2** and **5**.

Some candidates scored high marks in **Questions 2** and **5** but not many elsewhere. This suggests that they had good generic skills but lacked knowledge of the specification. If they had known the meaning of the technical terms used in **Questions 1, 3** and **4**, they would probably have achieved high grades.

Many candidates explained the meaning of sources, paragraphs or expressions in their own words instead of attempting the specific tasks which had been set.

Comments on specific questions

Section A

Topics for **Section A** may be drawn from any academic discipline. On this occasion, the subject area was public health.

Question 1

- (a) (i) In this specification, the word 'credibility' includes reliability, plausibility and consistency. On this occasion, all the points available for credit were aspects of reliability, but most candidates did not realise that they were expected to answer in terms of the five reliability criteria identified in the specification. Inappropriate answers, which were not credited, included that the source was credible because it included quantitative evidence and that it had low credibility because 2048 was too small a sample. Some candidates claimed that 'one of the world's top polling companies' had low reliability because it was not named, although it seems unlikely that they would have known how reliable the company was if the name had been given. Others recognised that being a top polling company enhanced the credibility of the survey, but were not awarded a mark because they did not link this judgement to reputation or expertise. Similarly, some candidates recognised that the credibility was reduced by the fact that the report was commissioned and published by a company which produces paper towels, but they did not link this to vested interest or, if they did,

did not explain what the company had a vested interest to do (namely, emphasise aspects of the results favourable to paper towels in order to increase sales). A few candidates mistakenly claimed that the source was unreliable because the members of the public whose opinions were surveyed lacked expertise.

- (ii) Many candidates mistakenly thought that the graph referred to the whole sample of 2048 US adults referred to in the first paragraph, which led them to make a wrong judgement in response to this question. In fact, the source clearly states that the graph refers only to 'those who preferred paper towels'. This is an example of the relevance of Thinking Skills to everyday life, where claims of this kind often occur and are likely (and perhaps intended) to mislead the casual reader. Very few candidates if any gained more than 1 mark, by giving a more nuanced judgement and explaining how the data can give limited support to the claim. Some candidates objected to the concept of a sample, claiming that one cannot make a claim about 'US adults' without asking all of them.
- (b)(i) Some candidates were misled by the word 'reliably' in the question and answered as if it were a question about reliability instead of evaluating an inference. However, most candidates who understood the question succeeded in gaining at least one mark out of two by pointing out that one of the researchers himself commented that the bacteria were unlikely to endanger the health of anyone with a healthy immune system, because they were 'probably found in most places where people congregate'. A fair number of candidates were awarded the full two marks.
- (ii) Questions testing the ability to draw an inference from evidence frequently begin 'How significant....' or 'Explain the significance...'. Questions in both those formats have occurred frequently in this exam over the years, but on this occasion not many candidates understood what this question was asking them to do. Those who did attempt the correct task generally over-stated the significance of the change from hot-air dryers to paper towels, claiming that this change proved that hot-air dryers are a health hazard. Some candidates mistakenly assessed the likely impact of the decision rather than its significance.
- (c) A fair proportion of candidates understood why how well the hands were washed was irrelevant to their being subsequently re-contaminated by the air dryers. Many others, however, missed this point and made general or vague criticisms of the claim, such as that the claims were unsupported by evidence, that the 'health professionals' were not identified or that the source was biased: these answers did not fulfil the precise task set and were therefore not credited.
- (d) Most candidates judged correctly that Source D was an argument, but many gave explanations which were unrelated to the specialised meaning of the word 'argument' used in Critical Thinking. A few candidates discussed whether Source D was a good argument, which is a different issue.

Question 2

As on previous occasions, a few candidates made good use of evaluation of sources and inferential reasoning, but many achieved only two, three or four marks out of eight, because they did no more than draw a conclusion based on some or all of the sources and perhaps some personal thinking unrelated to the sources. Significant proportions of candidates agreed with the claim, challenged it or adopted an intermediate position. A few candidates gave reasons on both sides, without forming a judgement, and therefore were not given a mark for their conclusion.

Section B

Question 3

On this occasion, all of the correct answers to **Questions 3(a)** and **3(b)** were contained in sentences which also included other argument elements, as indicated by the conjunctions 'because' or 'as'. The occurrence of these words should alert candidates to the presence of additional argument elements in the sentence, and they should make sure they do not include them in their answers.

- (a) A significant minority of candidates correctly identified the main conclusion of the argument, although nearly all of them lost a mark by quoting the whole sentence, including the clause beginning 'because'. There were many wrong answers and a significant minority of candidates expressed in their own words, and usually at some length, what they understood to be the gist of the argument instead of identifying the main conclusion.

- (b) Fewer candidates than usual achieved full marks on this question. Many answers were not intermediate conclusions, while most correct answers included additional argument elements and were therefore awarded one mark or even zero marks instead of two.
- (c) On this occasion, unusually, there were two questions about identifying an argument element and none about identifying an unstated assumption.
 - (i) Most candidates who attempted this question explained the meaning of the expression or the sentence containing it instead of identifying the argument element. Some correct answers included additional material, which suggests that even some candidates who achieved full marks on this question may not have known what they were being asked to do.
 - (ii) Most candidates who attempted this question explained or discussed the quotation, instead of identifying the argument element (reason) and explaining its function (supporting the intermediate conclusion 'people who work in those jobs should not be criticised for giving them priority').

Question 4

As on previous occasions, many candidates achieved zero marks on this part of the exam, apparently because they did not know what the questions meant or the kinds of answers which could have been correct.

- (a) Most attempts did not resemble answers to this question, presumably because candidates did not know the meaning of the word 'conflation', even though it is listed and briefly defined in the specification. A few candidates even stated, '*I do not know what conflation is.*' A significant number of candidates omitted this question.
- (b)(i) Many candidates did not correctly identify the analogy in paragraph 4 and were therefore unable to evaluate it. Those who did identify it criticised it, for either pertinent or spurious reasons. Very few if any found reasons to agree with the mark scheme that the analogy was 'fairly effective'.
- (ii) There were many wrong approaches to this question. Some candidates offered a second answer to **part (i)** or criticised the use of an analogy to illuminate one phenomenon by saying something about another, while others attempted literary criticism of paragraph 4 or suggested ways in which they thought the argument could have been improved, e.g. by introducing a counter. Very few candidates, if any, spotted that evidence about 'some parents' was inadequate to justify a general conclusion about 'spouses and children'; however, this is another example of the relevance of Thinking Skills, since this kind of careless or deliberately misleading reasoning frequently occurs in everyday life. Several candidates gained one or two marks by spotting the inconsistency between the attitudes to complaints about over-busy parents in paragraphs 1 and 4.

Question 5

Most, but not all, candidates argued in favour of the claim.

A wide variety of standards was achieved. Some answers were well structured, but most were undeveloped. A fair number of candidates made appropriate use of 'additional argument elements' (examples, evidence, analogies, counters with response or hypothetical reasoning), but fewer constructed their strands of reasoning to support intermediate conclusions.

Some candidates presented a balanced discussion of the topic, or argued in favour of a more moderate conclusion, instead of supporting or challenging the stated claim, which meant that part of their discussion could not be credited. As stated in the instructions for this question, material drawn from the passage used as the basis for **Questions 3 and 4** was also not credited.

THINKING SKILLS

Paper 9694/22 Critical Thinking
--

Key messages

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

General comments

A reasonable proportion of candidates were well-prepared for the paper and these well-prepared candidates seemed to produce answers which fairly reflected their critical thinking ability.

Comments on specific questions

Question 1

- (a) (i) The vast majority of candidates saw that the research about the risk of stroke for the over 65s was a correct answer. Only a minority went on to make the point about cholesterol accumulating over time. A surprising number of candidates thought that having to take the pills for the remainder of one's life supported the policy but clearly this point is not age-specific.
- (ii) This part was answered less well, with a number of candidates not making the point that those at risk below the age specified for taking statins would lose out on treatment if this proposal was adopted. The words 'and not to anyone else' were crucial to the wording of the policy.
- (b) Most candidates got at least 1 mark here. Answers tended to make the judgement either 'reliable' or 'unreliable' but the evidence suggested an element of uncertainty. A pleasing number of candidates saw that the CFO's expertise might not be relevant but that 'reverse vested interest' did increase reliability. Such answers suggested good preparation for credibility questions.
- (c) This question was not answered well with many candidates not understanding what was required. Of those that did understand the question, a majority thought that not referring to statins did weaken the application of the evidence. Only a minority of candidates arrived at the correct answer that statins clearly fell into the category of drugs being referred to in Source B whilst not being mentioned specifically.
- (d) There were also few correct answers to this question. Many candidates did not understand what was required, often suggesting there was a conflict of interest when the question required candidates to challenge this idea. A minority of candidates did successfully challenge the idea and usually gained 3 marks.

Question 2

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

Question 3

- (a) Unlike in some previous papers, a good proportion of the candidates correctly identified the main conclusion.
- (b) Most candidates identified at least one intermediate conclusion and many candidates who wrongly identified the main conclusion managed to get two. A significant number of candidates managed to score 6 on this question.
- (c) A significant number of candidates identified at least one assumption, usually that tour guides were not informed professionals. This is encouraging, as identifying assumptions has always proved to be one of the more challenging aspects of critical thinking. There are still however a significant number of candidates who challenge what is stated in the text, thus showing they have not understood what is meant by an assumption as defined in the specification and textbooks.
- (d) A disappointing number of candidates did not understand the notion of an argument element. Many discussed the cause/correlation problem, which was not the focus of this particular question. Those that were following the correct path often plumped for it being evidence rather than an example of residents fleeing. This should have been an easy question for candidates with an understanding of what is meant by an argument element in general and this argument element in particular. It is curious that even otherwise well-prepared candidates seemed to struggle with this question.

Question 4

- (a) This question was answered well, with many candidates seeing the cause/correlation problem in the relationship expressed in the text between tour guides and the number of tourists. It was intended that this would be an easier question, and candidates were able to criticise the rather bizarre relationship between the number of tour guides and tourists suggested in the text.
- (b) Very few candidates managed to spot two flaws or weaknesses. The flaws in paragraph 1 were identified more readily, especially the further causal flaw in the relation between the depopulation of Venice and the number of tourists. Many candidates made the point that tourists would not be able to ask people the way if they did not speak the language but this was a challenge to the claim in the text, 'They can always ask someone the way if they get lost'. In tackling such questions, candidates most always make sure they are evaluating the reasoning and not challenging what is stated in the text.

Question 5

Candidates did present arguments, on the whole, and avoided a more essay-like structure, which was common in answers to the equivalent question in the previous specification. However, a significant number of candidates are still presenting arguments for *and* against the claim which is not what is required. Any points against the argument they are making need to be countered and this will then be credited. In relation to this particular topic, some candidates tended to drift away from the point about historic places and focused on tourism in general, which meant they often started to repeat points made in the passage. This was especially the case if they chose to oppose the idea.

THINKING SKILLS

Paper 9694/23 Critical Thinking
--

Key messages

On this occasion, nearly all the candidates seemed to have at least a fair idea of what the questions expected them to do. Although this exam tests skills more than knowledge, the specification does identify some subject knowledge which candidates are expected to know, and it is impossible to perform well in the exam without knowing such items as reliability criteria, the meanings of the expressions ‘argument element’ and ‘unstated assumption’ and the names of certain flaws and weaknesses in reasoning.

General comments

This was the second year and third session in which the new specification and the new format for the exam were tested. The candidature for this paper is always smaller than the other regions, but on this occasion there were even fewer candidates than usual.

Nearly all candidates attempted all the questions. They produced a wide range of achievement.

Comments on specific questions

Section A

Topics for **Section A** may be drawn from any academic discipline. On this occasion, the subject area was behavioural ecology.

Question 1

- (a) Candidates performed fairly well on this question, although very few said enough to gain the full four marks available. Many recognised that the source had inferred more than the evidence justified, which was the main reason for asking the question.
- (b) The ‘usefulness’ of a source involves both reliability and significance, since a source which is either unreliable or insignificant cannot be useful. A lot of valid comments about the usefulness of Source B could be made, and almost all candidates scored at least 1 mark.
- (c) Most candidates judged correctly that Source C is an argument and most of them explained their answer well enough to score two marks out of two. Some of those who judged that Source C is not an argument appeared not to know the technical meaning of the word ‘argument’ as used in Critical Thinking (and philosophy).
- (d) Most, but not all, candidates recognised that this question was designed to elicit evaluations based on the five reliability criteria listed in the specification. Four valid points were available for credit, and a fair proportion of candidates identified at least two of them, thereby gaining two marks out of two.
- (e) This was the hardest part of **Question 1** and not many candidates performed well on it. Candidates tended to summarise or even quote the content of Sources D and E instead of identifying the different perspectives which gave rise to the differences in content.

Question 2

Very few candidates achieved middle marks on this question. A good number scored 7 or 8, by making well-judged use of evaluation of sources and inferential reasoning, while nearly all the others scored 2 or 3, for drawing a conclusion based on referring to all or some of the sources but nothing more. Some of those who scored low marks had unsuccessfully attempted evaluation of sources or inferential reasoning.

Section B

The argument presented for analysis and evaluation touched on a number of issues that are frequently encountered in current political debate and statements of public policy. Some of the questions related to assumptions and flawed reasoning which often occur in such discussions and thereby potentially indicated the relevance of this specification to everyday life.

Question 3

- (a) The main conclusion was located in a prominent, albeit not particularly predictable, position and most candidates identified it correctly.
- (b) On this occasion, candidates were invited to identify three intermediate conclusions rather than the more usual two, and five correct answers were available. Many candidates gained full marks on this question. A few lost marks by including additional argument elements in their answers, especially when the intermediate conclusion did not constitute the whole of a sentence. The first sentence of paragraph 3 was a popular wrong answer.
- (c) As last year and in other papers, the biggest obstacle which candidates encountered in approaching this question was that they did not know what an argument element is. Most of those candidates who did know what kind of answer was expected correctly identified the words as evidence, but fewer stated of what it was evidence.
- (d) On this occasion, only one correct answer to this question was available, but several candidates spotted it. Unlike previous sessions, almost all candidates attempted the right task, although there were quite a lot of wrong answers.

Question 4

As in the other sessions in which this format of the exam has occurred, this question produced by far the weakest results, apparently because candidates did not understand what they were being asked to do. Even some candidates who performed quite well in the exam as a whole achieved very low marks on this part.

- (a) This question was not too difficult for anyone who was familiar with the appeals listed on the specification, and most candidates correctly identified the appeal to authority, although fewer succeeded in evaluating this appeal.
- (b) Many candidates correctly identified and explained the equivocal use of the word 'universal' and recognised that the flaw fatally weakens the reasoning in paragraph 1. Some credit was given to candidates who suggested that 'education' refers to something radically different in school and at university.
- (c) The analogy which candidates were asked to evaluate was between academic potential and height. Most candidates thought the analogy was completely inappropriate, since height has a genetic basis whereas (according to them) academic potential does not. The 'correct' answer was more nuanced than this.
- (d) Very few candidates correctly identified the causal flaw in paragraph 4, perhaps because the flawed claim is a rarely challenged commonplace of current political discourse.

Question 5

A full range of marks was awarded to this question. Several candidates achieved 7 or 8 out of 8, some of whom exceeded the requirements for full marks. Many candidates made appropriate use of 'additional argument elements' (examples, evidence, analogies, counters with response or hypothetical reasoning), and some constructed their strands of reasoning to support intermediate conclusions.

THINKING SKILLS

Paper 9694/31 Problem Analysis and Solution
--

Key messages

Explanations usually require words, but just a few sentences, not a lengthy discourse.

Candidates should remember that they need to demonstrate to the examiner that they know how to solve problems and have done so. Some of the work was so haphazardly presented that it was difficult to follow.

It is important to check that the response is of a form that answers the question. Using units can be a simple way to detect errors at any stage, and an answer in, say, kilometres per square dollar is unlikely to be the answer to any question.

Comments on specific questions

Question 1 – Sponsorship

The marks on this question were spread uniformly.

- (a) Some candidates stopped adding the figures when they reached a blank in the table, but most were awarded two marks.
- (b) Some candidates offered a minimum distance that was longer than the entire course. Most were not awarded this mark.
- (c) Most candidates found at least one value. Wrong values were very rare, but the availability of two marks should have offered a hint that there might be more than one possibility.
- (d) Many candidates included the amount for finishing the marathon in their calculations, despite the context clearly being considering cases when she had not finished.
- (e) Very few candidates observed that if 16 is the minimum then the case of not being able to do it with 15 is the one of interest. Rounding errors were very common: rounding the wrong way, premature rounding, or both.

Question 2 – Quiz

Many candidates did not note the various halves and doubles that were a feature of this question.

- (a) Some candidates sought the expected or the most likely amount rather than the (much simpler) limit case.
- (b) Some candidates tried to do separate calculations for each player and did not appreciate that it was a question about the totals. Few of those who handled them separately correctly handled the case where someone had less money than when they started.
- (c) Many candidates ignored the initial \$200 each or the reduction from three incorrect quiz answers.
- (d)(i) Arithmetic errors, sometimes seemingly from poor handwriting, were surprisingly common when dealing with sums that are low multiples of \$50.

- (ii) Some candidates who had got **part (i)** wrong appeared to think **part (ii)** was impossible, but not many of them seemed to review their answer to **part (i)**. Many candidates did not seem to identify the order of players from the information given.
- (e) Most candidates were awarded the first mark for getting a correct (halved) amount from the first day, but many did not include the contribution from the second.

Question 3 – Rope

Many candidates ignored the relatively simple constraint in the short stem: measuring between ribbons or from an end. Creativity involving folding the rope or using it repeatedly were not addressing the problem at hand. No notation was suggested or required, but some of the muddled descriptions made it difficult to check the working. Candidates found it much easier to deal with the parts using a fixed length than those later parts where the length of rope was not given.

- (a) Many candidates omitted the distances between ribbons and only considered the distances from an end. Some gave answers such as 5 m without any explanation as to how they envisaged it to be achieved.
- (b) A simple diagram had been envisaged, but there were some very elaborate drawings given in this part.
- (c) Most were not awarded these marks.
- (d) A variety of creative answers using powers of 2 or 3 were offered, as well as nC_m for various values of n and m , but some responses were denoted as being in metres, which is a strange answer to 'number of ways'. Very few answered this part correctly.
- (e) Measuring a length of zero was not considered as one of the possible lengths.

Question 4 – Matchbox

This question had many parts where an example was asked for. Giving more than one example can never improve the score, but can spoil a response. In this case the large number of possible answers may have been disconcerting, but there is no best example and no extra marks for selecting one; pick one and move on. Most candidates were not awarded any marks on this question.

- (a) This question offered two marks for the areas of the tray and the sleeve. Some candidates just gave the total area.
- (b) Many responses to this question showed no working at all, rarely a correct answer, and with no consistent feature, suggesting random guessing, rather than any common misreading.
- (c) Although it may look more complicated, examples needed just to have the length being twice the height. Responses by weaker candidates without supporting working suggested some lucky guesses.
- (d) Most candidates did not provide a response to this part, and those that guessed would have been most unlikely to alight on the only solution.
- (e) Some candidates used the areas to determine how much would be left over, without considering the constraint of the pieces being the same size, shape and orientation.
- (f) (i) Most candidates did not provide a response to this part.
(ii) Only one candidate gave a fully correct answer.

THINKING SKILLS

Paper 9694/32 Problem Analysis and Solution
--

Key messages

Explanations usually require words, but just a few sentences, not a lengthy discourse.

Candidates should remember that they need to demonstrate to the examiner that they know how to solve problems and have done so. Some of the work was so haphazardly presented that it was difficult to follow.

It is important to check that the response is of a form that answers the question. Using units can be a simple way to detect errors at any stage, and an answer in, say, kilometres per square dollar is unlikely to be the answer to any question.

Comments on specific questions

Question 1 – Sponsorship

The marks on this question were spread uniformly.

- (a) Some candidates stopped adding the figures when they reached a blank in the table, but most were awarded two marks.
- (b) Some candidates offered a minimum distance that was longer than the entire course. Most were not awarded this mark.
- (c) Most candidates found at least one value. Wrong values were very rare, but the availability of two marks should have offered a hint that there might be more than one possibility.
- (d) Many candidates included the amount for finishing the marathon in their calculations, despite the context clearly being considering cases when she had not finished.
- (e) Very few candidates observed that if 16 is the minimum then the case of not being able to do it with 15 is the one of interest. Rounding errors were very common: rounding the wrong way, premature rounding, or both.

Question 2 – Quiz

Many candidates did not note the various halves and doubles that were a feature of this question.

- (a) Some candidates sought the expected or the most likely amount rather than the (much simpler) limit case.
- (b) Some candidates tried to do separate calculations for each player and did not appreciate that it was a question about the totals. Few of those who handled them separately correctly handled the case where someone had less money than when they started.
- (c) Many candidates ignored the initial \$200 each or the reduction from three incorrect quiz answers.
- (d)(i) Arithmetic errors, sometimes seemingly from poor handwriting, were surprisingly common when dealing with sums that are low multiples of \$50.

- (ii) Some candidates who had got **part (i)** wrong appeared to think **part (ii)** was impossible, but not many of them seemed to review their answer to **part (i)**. Many candidates did not seem to identify the order of players from the information given.
- (e) Most candidates were awarded the first mark for getting a correct (halved) amount from the first day, but many did not include the contribution from the second.

Question 3 – Rope

Many candidates ignored the relatively simple constraint in the short stem: measuring between ribbons or from an end. Creativity involving folding the rope or using it repeatedly were not addressing the problem at hand. No notation was suggested or required, but some of the muddled descriptions made it difficult to check the working. Candidates found it much easier to deal with the parts using a fixed length than those later parts where the length of rope was not given.

- (a) Many candidates omitted the distances between ribbons and only considered the distances from an end. Some gave answers such as 5 m without any explanation as to how they envisaged it to be achieved.
- (b) A simple diagram had been envisaged, but there were some very elaborate drawings given in this part.
- (c) Most were not awarded these marks.
- (d) A variety of creative answers using powers of 2 or 3 were offered, as well as nC_m for various values of n and m , but some responses were denoted as being in metres, which is a strange answer to 'number of ways'. Very few answered this part correctly.
- (e) Measuring a length of zero was not considered as one of the possible lengths.

Question 4 – Matchbox

This question had many parts where an example was asked for. Giving more than one example can never improve the score, but can spoil a response. In this case the large number of possible answers may have been disconcerting, but there is no best example and no extra marks for selecting one; pick one and move on. Most candidates were not awarded any marks on this question.

- (a) This question offered two marks for the areas of the tray and the sleeve. Some candidates just gave the total area.
- (b) Many responses to this question showed no working at all, rarely a correct answer, and with no consistent feature, suggesting random guessing, rather than any common misreading.
- (c) Although it may look more complicated, examples needed just to have the length being twice the height. Responses by weaker candidates without supporting working suggested some lucky guesses.
- (d) Most candidates did not provide a response to this part, and those that guessed would have been most unlikely to alight on the only solution.
- (e) Some candidates used the areas to determine how much would be left over, without considering the constraint of the pieces being the same size, shape and orientation.
- (f) (i) Most candidates did not provide a response to this part.
(ii) Only one candidate gave a fully correct answer.

THINKING SKILLS

Paper 9694/33 Problem Analysis and Solution
--

Key messages

Explanations usually require words, but just a few sentences, not a lengthy discourse.

Candidates should remember that they need to demonstrate to the examiner that they know how to solve problems and have done so. Some of the work was so haphazardly presented that it was difficult to follow.

It is important to check that the response is of a form that answers the question. Using units can be a simple way to detect errors at any stage, and an answer in, say, kilometres per square dollar is unlikely to be the answer to any question.

Comments on specific questions

Question 1 – Sponsorship

The marks on this question were spread uniformly.

- (a) Some candidates stopped adding the figures when they reached a blank in the table, but most were awarded two marks.
- (b) Some candidates offered a minimum distance that was longer than the entire course. Most were not awarded this mark.
- (c) Most candidates found at least one value. Wrong values were very rare, but the availability of two marks should have offered a hint that there might be more than one possibility.
- (d) Many candidates included the amount for finishing the marathon in their calculations, despite the context clearly being considering cases when she had not finished.
- (e) Very few candidates observed that if 16 is the minimum then the case of not being able to do it with 15 is the one of interest. Rounding errors were very common: rounding the wrong way, premature rounding, or both.

Question 2 – Quiz

Many candidates did not note the various halves and doubles that were a feature of this question.

- (a) Some candidates sought the expected or the most likely amount rather than the (much simpler) limit case.
- (b) Some candidates tried to do separate calculations for each player and did not appreciate that it was a question about the totals. Few of those who handled them separately correctly handled the case where someone had less money than when they started.
- (c) Many candidates ignored the initial \$200 each or the reduction from three incorrect quiz answers.
- (d)(i) Arithmetic errors, sometimes seemingly from poor handwriting, were surprisingly common when dealing with sums that are low multiples of \$50.

- (ii) Some candidates who had got **part (i)** wrong appeared to think **part (ii)** was impossible, but not many of them seemed to review their answer to **part (i)**. Many candidates did not seem to identify the order of players from the information given.
- (e) Most candidates were awarded the first mark for getting a correct (halved) amount from the first day, but many did not include the contribution from the second.

Question 3 – Rope

Many candidates ignored the relatively simple constraint in the short stem: measuring between ribbons or from an end. Creativity involving folding the rope or using it repeatedly were not addressing the problem at hand. No notation was suggested or required, but some of the muddled descriptions made it difficult to check the working. Candidates found it much easier to deal with the parts using a fixed length than those later parts where the length of rope was not given.

- (a) Many candidates omitted the distances between ribbons and only considered the distances from an end. Some gave answers such as 5 m without any explanation as to how they envisaged it to be achieved.
- (b) A simple diagram had been envisaged, but there were some very elaborate drawings given in this part.
- (c) Most were not awarded these marks.
- (d) A variety of creative answers using powers of 2 or 3 were offered, as well as nC_m for various values of n and m , but some responses were denoted as being in metres, which is a strange answer to 'number of ways'. Very few answered this part correctly.
- (e) Measuring a length of zero was not considered as one of the possible lengths.

Question 4 – Matchbox

This question had many parts where an example was asked for. Giving more than one example can never improve the score, but can spoil a response. In this case the large number of possible answers may have been disconcerting, but there is no best example and no extra marks for selecting one; pick one and move on. Most candidates were not awarded any marks on this question.

- (a) This question offered two marks for the areas of the tray and the sleeve. Some candidates just gave the total area.
- (b) Many responses to this question showed no working at all, rarely a correct answer, and with no consistent feature, suggesting random guessing, rather than any common misreading.
- (c) Although it may look more complicated, examples needed just to have the length being twice the height. Responses by weaker candidates without supporting working suggested some lucky guesses.
- (d) Most candidates did not provide a response to this part, and those that guessed would have been most unlikely to alight on the only solution.
- (e) Some candidates used the areas to determine how much would be left over, without considering the constraint of the pieces being the same size, shape and orientation.
- (f) (i) Most candidates did not provide a response to this part.
(ii) Only one candidate gave a fully correct answer.

THINKING SKILLS

Paper 9694/41 Applied Reasoning
--

Key messages

- In **Question 1**, identifying the main conclusion proved unusually difficult for candidates.
- In **Question 2**, most candidates did as they were asked and attempted to evaluate the reasoning.
- In **Question 4**, most candidates created their own argument structure, ignoring the sequence in which the documents are presented, and some engaged *critically* with the documents provided.

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**. Fewer candidates wrote disproportionately long answers for the earlier, lower-tariff questions. There was some evidence of improvement from the summer on candidate performance on the question that was most different from the legacy syllabus, **1(b)**.

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

Comments on specific questions

Question 1

The middle parts of **Question 1** rewarded the well-prepared candidate. Those who knew what was expected and attempted to analyse the argument usually gained between 2 and 4 of the 8 marks for analysis. Some candidates were unaware that quoting from the text is necessary for answering this question. Only in **part (b)** did a significant number of candidates stray from the required path of analysis into the realm of evaluation.

- (a) Most candidates knew what was required and attempted to identify the conclusion. However, perhaps because of the more polite, aspirational way in which it was phrased in the context of a letter to parents, few selected the correct answer. 'It is important that candidates bring their laptops to every lesson' was a common incorrect response. A few answers gave the gist of the argument.
- (b) A slightly higher proportion of candidates than in the summer knew how to approach this question, however, many still did not know 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. It was relatively common for well-prepared candidates to be awarded award 1 or 2, but the award of all 3 marks was rare.

- (c) Candidates were more successful at this part of the question, which closely resembled the format of the question on the legacy paper. However, the award of more than 1 mark was relatively uncommon, because candidates often included words that were not part of the IC they were trying to identify. For example, 'The internet provides a vast resource of up-to-date information, so the devices support the development of research skills', was frequently offered as an answer and given no credit, as the words before the 'so' are not part of the intermediate conclusion. Almost all candidates followed the instruction to give only three answers. A few responses offered

intermediate conclusions that were not from those paragraphs stated in the question – proving the value of reading the question carefully. Interestingly, some candidates that had paraphrased in **part (b)** stated precise and correct answers in **part (c)**.

- (d) Identifying assumptions proves a difficult skill for candidates to apply. Few got anywhere near a correct answer, with most answers offering something that was written in the text.

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 even relatively well-prepared candidates struggled to gain more than 3 marks. No response gained more than 5 out of the 6 marks available. Marks were most commonly gained for identifying the weak support and appeal to popularity in paragraph 2 or the first and third points in paragraph 3 – the former most often described as a straw man and the latter often phrased (well) as an assumption.
- (b) The question wanted candidates to discuss Mr Lee’s weakness as a source of information in the letter, but some candidates attempted to criticise the reasoning in specific claims that Mr Lee had made. Many candidates approached the answer correctly and attempted to examine Mr Lee’s credibility, but few distinguished sufficiently between vested interest and bias to gain all 3 marks. Some answers discussed how Mr Lee’s expertise in IT might strengthen his credibility, for no credit.

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. It was common to award 2 marks and 4 were given occasionally, invariably for either the generalisation from a single school or the mismatch between claim and question. Valid comments on the inherent bias of asking colleagues or of offering an agree/disagree choice were seen, but rarely.

Question 4

Candidates were required to use the documents to construct a reasoned case to support or challenge the conclusion that ‘We should encourage the use of electronic devices by candidates in lessons’. Most were able to engage with this topic, with the majority arguing against the given conclusion. Almost all candidates attempted to construct their own arguments, with very few relying on sequentially summarising the documents. Some candidates were able to arrange their ideas into strands of reasoning that each supported an intermediate conclusion and, hence, score 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. Arguments supporting the conclusion were strengthened by effectively responding to potential objections about the cost of these devices or the opportunities for distraction they might provide; those challenging the conclusion were strengthened if they included effective responses to objections about the need for innovation in education. It is worth reminding centres that what is likely to get high marks is a persuasive argument with a clear structure that is supported by thoughtful, particularly critical, use of the documents and that thoughtfully considers relevant alternative viewpoints.

THINKING SKILLS

Paper 9694/42 Applied Reasoning
--

Key messages

- In **Question 1**, identifying the main conclusion proved unusually difficult for candidates.
- In **Question 2**, most candidates did as they were asked and attempted to evaluate the reasoning.
- In **Question 4**, most candidates created their own argument structure, ignoring the sequence in which the documents are presented, and some engaged *critically* with the documents provided.

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**. Fewer candidates wrote disproportionately long answers for the earlier, lower-tariff questions. There was some evidence of improvement from the summer on candidate performance on the question that was most different from the legacy syllabus, **1(b)**.

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

Comments on specific questions

Question 1

The middle parts of **Question 1** rewarded the well-prepared candidate. Those who knew what was expected and attempted to analyse the argument usually gained between 2 and 4 of the 8 marks for analysis. Some candidates were unaware that quoting from the text is necessary for answering this question. Only in **part (b)** did a significant number of candidates stray from the required path of analysis into the realm of evaluation.

- (a) Most candidates knew what was required and attempted to identify the conclusion. However, perhaps because of the more polite, aspirational way in which it was phrased in the context of a letter to parents, few selected the correct answer. 'It is important that candidates bring their laptops to every lesson' was a common incorrect response. A few answers gave the gist of the argument.
- (b) A slightly higher proportion of candidates than in the summer knew how to approach this question, however, many still did not know 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. It was relatively common for well-prepared candidates to be awarded award 1 or 2, but the award of all 3 marks was rare.

- (c) Candidates were more successful at this part of the question, which closely resembled the format of the question on the legacy paper. However, the award of more than 1 mark was relatively uncommon, because candidates often included words that were not part of the IC they were trying to identify. For example, 'The internet provides a vast resource of up-to-date information, so the devices support the development of research skills', was frequently offered as an answer and given no credit, as the words before the 'so' are not part of the intermediate conclusion. Almost all candidates followed the instruction to give only three answers. A few responses offered

intermediate conclusions that were not from those paragraphs stated in the question – proving the value of reading the question carefully. Interestingly, some candidates that had paraphrased in **part (b)** stated precise and correct answers in **part (c)**.

- (d) Identifying assumptions proves a difficult skill for candidates to apply. Few got anywhere near a correct answer, with most answers offering something that was written in the text.

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 even relatively well-prepared candidates struggled to gain more than 3 marks. No response gained more than 5 out of the 6 marks available. Marks were most commonly gained for identifying the weak support and appeal to popularity in paragraph 2 or the first and third points in paragraph 3 – the former most often described as a straw man and the latter often phrased (well) as an assumption.
- (b) The question wanted candidates to discuss Mr Lee’s weakness as a source of information in the letter, but some candidates attempted to criticise the reasoning in specific claims that Mr Lee had made. Many candidates approached the answer correctly and attempted to examine Mr Lee’s credibility, but few distinguished sufficiently between vested interest and bias to gain all 3 marks. Some answers discussed how Mr Lee’s expertise in IT might strengthen his credibility, for no credit.

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. It was common to award 2 marks and 4 were given occasionally, invariably for either the generalisation from a single school or the mismatch between claim and question. Valid comments on the inherent bias of asking colleagues or of offering an agree/disagree choice were seen, but rarely.

Question 4

Candidates were required to use the documents to construct a reasoned case to support or challenge the conclusion that ‘We should encourage the use of electronic devices by candidates in lessons’. Most were able to engage with this topic, with the majority arguing against the given conclusion. Almost all candidates attempted to construct their own arguments, with very few relying on sequentially summarising the documents. Some candidates were able to arrange their ideas into strands of reasoning that each supported an intermediate conclusion and, hence, score 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. Arguments supporting the conclusion were strengthened by effectively responding to potential objections about the cost of these devices or the opportunities for distraction they might provide; those challenging the conclusion were strengthened if they included effective responses to objections about the need for innovation in education. It is worth reminding centres that what is likely to get high marks is a persuasive argument with a clear structure that is supported by thoughtful, particularly critical, use of the documents and that thoughtfully considers relevant alternative viewpoints.

THINKING SKILLS

Paper 9694/43 Applied Reasoning
--

Key messages

- In **Question 1**, identifying the main conclusion proved unusually difficult for candidates.
- In **Question 2**, most candidates did as they were asked and attempted to evaluate the reasoning.
- In **Question 4**, most candidates created their own argument structure, ignoring the sequence in which the documents are presented, and some engaged *critically* with the documents provided.

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**. Fewer candidates wrote disproportionately long answers for the earlier, lower-tariff questions. There was some evidence of improvement from the summer on candidate performance on the question that was most different from the legacy syllabus, **1(b)**.

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

Comments on specific questions

Question 1

The middle parts of **Question 1** rewarded the well-prepared candidate. Those who knew what was expected and attempted to analyse the argument usually gained between 2 and 4 of the 8 marks for analysis. Some candidates were unaware that quoting from the text is necessary for answering this question. Only in **part (b)** did a significant number of candidates stray from the required path of analysis into the realm of evaluation.

- (a) Most candidates knew what was required and attempted to identify the conclusion. However, perhaps because of the more polite, aspirational way in which it was phrased in the context of a letter to parents, few selected the correct answer. 'It is important that candidates bring their laptops to every lesson' was a common incorrect response. A few answers gave the gist of the argument.
- (b) A slightly higher proportion of candidates than in the summer knew how to approach this question, however, many still did not know 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. It was relatively common for well-prepared candidates to be awarded award 1 or 2, but the award of all 3 marks was rare.

- (c) Candidates were more successful at this part of the question, which closely resembled the format of the question on the legacy paper. However, the award of more than 1 mark was relatively uncommon, because candidates often included words that were not part of the IC they were trying to identify. For example, 'The internet provides a vast resource of up-to-date information, so the devices support the development of research skills', was frequently offered as an answer and given no credit, as the words before the 'so' are not part of the intermediate conclusion. Almost all candidates followed the instruction to give only three answers. A few responses offered

intermediate conclusions that were not from those paragraphs stated in the question – proving the value of reading the question carefully. Interestingly, some candidates that had paraphrased in **part (b)** stated precise and correct answers in **part (c)**.

- (d) Identifying assumptions proves a difficult skill for candidates to apply. Few got anywhere near a correct answer, with most answers offering something that was written in the text.

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 even relatively well-prepared candidates struggled to gain more than 3 marks. No response gained more than 5 out of the 6 marks available. Marks were most commonly gained for identifying the weak support and appeal to popularity in paragraph 2 or the first and third points in paragraph 3 – the former most often described as a straw man and the latter often phrased (well) as an assumption.
- (b) The question wanted candidates to discuss Mr Lee’s weakness as a source of information in the letter, but some candidates attempted to criticise the reasoning in specific claims that Mr Lee had made. Many candidates approached the answer correctly and attempted to examine Mr Lee’s credibility, but few distinguished sufficiently between vested interest and bias to gain all 3 marks. Some answers discussed how Mr Lee’s expertise in IT might strengthen his credibility, for no credit.

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. It was common to award 2 marks and 4 were given occasionally, invariably for either the generalisation from a single school or the mismatch between claim and question. Valid comments on the inherent bias of asking colleagues or of offering an agree/disagree choice were seen, but rarely.

Question 4

Candidates were required to use the documents to construct a reasoned case to support or challenge the conclusion that ‘We should encourage the use of electronic devices by candidates in lessons’. Most were able to engage with this topic, with the majority arguing against the given conclusion. Almost all candidates attempted to construct their own arguments, with very few relying on sequentially summarising the documents. Some candidates were able to arrange their ideas into strands of reasoning that each supported an intermediate conclusion and, hence, score 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. Arguments supporting the conclusion were strengthened by effectively responding to potential objections about the cost of these devices or the opportunities for distraction they might provide; those challenging the conclusion were strengthened if they included effective responses to objections about the need for innovation in education. It is worth reminding centres that what is likely to get high marks is a persuasive argument with a clear structure that is supported by thoughtful, particularly critical, use of the documents and that thoughtfully considers relevant alternative viewpoints.