Qualification Accredited

OCR
Oxford Cambridge and RSA

AS LEVEL

Examiners' report

MATHEMATICS B (MEI)

H630

For first teaching in 2017

H630/02 Summer 2023 series

Version 1

ocr.org.uk/maths

Contents

Introduction

Our examiners’ reports are produced to offer constructive feedback on candidates’ performance in the examinations. They provide useful guidance for future candidates.

The reports will include a general commentary on candidates’ performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. A selection of candidate answers is also provided. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

Where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.

A full copy of the question paper and the mark scheme can be downloaded from our secure Teach Cambridge site (https://teachcambridge.org).

Paper 2 series overview

This is the fourth full series for the linear H630 AS Mathematics B (MEI) specification. Candidates coped well with the mixture of questions from the Pure and Statistics parts of the specification.

Most candidates found this paper reasonably accessible and were able to accrue marks for demonstrating basic techniques and knowledge, as well as applying what they knew to a variety of modelling situations. Gaps in algebraic understanding were evident among the candidates who did less well. Knowledge of the large data set (LDS) remains split, with some candidates seeming very familiar with it while other seem to have limited experience of it. Most candidates were able to use the correct statistical language in context, but Questions 1 (a), 8, 12 (b), 13 (b) and 15 (d) proved to be challenging for many candidates, either because they did not understand the nuance of the question, or they were not able to use the correct statistical terminology to articulate their reasoning.

No candidate obtained full marks, but more candidates obtained over half mark compared to previous to previous series, and the distribution of marks had a clear negative skew. Question 13 (b) had the highest no response rate. There was no evidence of candidates running out of time.

Candidates who did well on this paper generally:	Candidates who did less well on this paper generally:
• had good knowledge in basic techniques, for example completing the square • could apply standard statistical calculations and interpret their solutions in context • gave contextual, evaluative responses when required, for example in hypothesis testing or in analysing the viability of a statistical model • were able to convey their ideas in questions requiring a written response, using known/calculated/given statistical data to inform their conclusions • were able to use the diagrams/data extracts/statistical information given to make data based inferences that were fully justified in context; they commented on the data and did not make suppositions or involve extraneous variables.	• struggled with standard statistical techniques such as hypothesis testing • answered questions that required knowledge of the LDS with suppositions and inferences that only came from the given data extracts • had limited understanding of what data was presented in the LDS • did not use the correct statistical language to communicate their ideas, e.g. 'a line of correlation', etc. • used incorrect methods to establish the boundary limits for outliers, or incorrect formulae for the cosine rule, etc. • did not quote formulae before attempting to use them, e.g. cosine rule/discriminant.

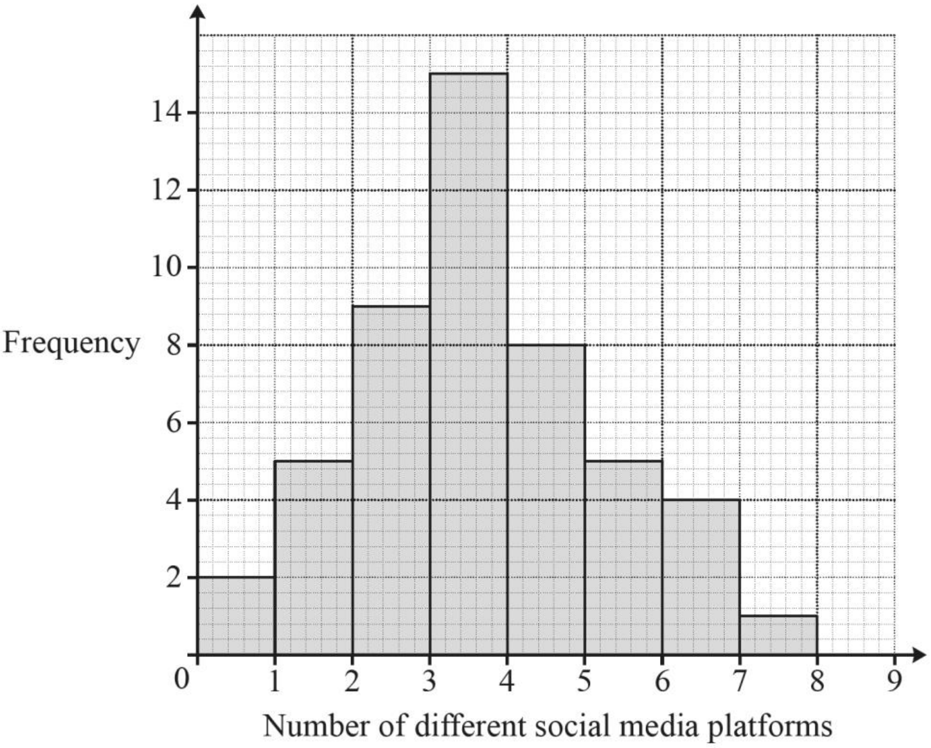
Question 1 (a)

1 A researcher collects data concerning the number of different social media platforms used by school pupils on a typical weekday.

The frequency table for the data is shown below.

Number of different social media platforms	0	1	2	3	4	5	6	7
Frequency	2	5	9	15	8	5	4	1

The researcher uses software to represent the results in this diagram.



(a) Explain why this diagram is inappropriate. **[1]**

This question proved to be quite challenging for many candidates, with many incorrect answers given. Common incorrect answers were that there were no gaps between the bars, or frequency was on the '*y*-axis' and not frequency density, or an ambiguous comment such as 'this is discrete data'. Some referred to the fact that the histogram uses ranges but did not use correct statistical terminology to explain why this was not allowed.

Candidates who did well on this question used the correct statistical terminology to describe either the original data or the data provided on the diagram and gave a reasoned argument for the irrelevance of the histogram. This question hinged on candidates commenting on the type(s) of data that was being presented, rather than the deficiencies in the drawing of the diagram.

Question 1 (b) (i)

(b) Calculate the following for the number of social media platforms used:

(i) the mean, **[1]**

This question was answered very well by the vast majority of candidates, with occasional lapses in accuracy spoiling correct attempts at both part (i) and (ii), e.g. ‘3.2’ in (i), which gained SC1, followed by ‘1.6’ for (ii), which scored 0.

Question 1 (b) (ii)

(ii) the standard deviation. **[1]**

This question was also answered very well by candidates using their calculator. Using the population standard deviation was also condoned for the mark.

Question 2 (a)

2 **(a)** Express $x^2 - 6x + 1$ in the form $(x-a)^2 - b$, where a and b are integers to be determined. **[2]**

Almost all candidates scored the marks for this question, with many correct attempts seen. Common errors included simplifying the numbers incorrectly or factorising instead of completing the square.

Question 2 (b)

(b) **Hence** state the coordinates of the turning point on the graph of $y = x^2 - 6x + 1$. **[1]**

This question was extremely well answered by many. Candidates that had incorrectly completed the square in (a) could score a follow through mark for correctly writing down their turning point. Errors with signs or restarting by unnecessary differentiation, etc. were common among the incorrect responses.

Question 3

3 A student makes the following conjecture.

For all positive integers n, $6n-1$ is always prime.

Use a counter example to disprove this conjecture. **[2]**

Virtually all candidates were able to score at least 1 mark on this question for correctly evaluating the expression for any positive value of *n*. A minority of candidates made assertions that '35 isn't prime' (for example) with no justification. Candidates needed to justify their conclusions, so either a divisor of their '35' was needed or a factorised form. It was also a stipulation that candidates make a concluding statement, as we expect candidates to communicate using correct mathematical reasoning.

Question 4 (a)

4 The equation of a curve is $y = \frac{k}{x^2}$, where k is a constant.

The curve passes through the point (2, 1).

(a) Find the value of k. **[1]**

This question was almost always responded to correctly, with only errors in algebra or arithmetic preventing success.

Question 4 (b)

(b) Sketch the curve. **[2]**

There were many correct solutions seen to this question. Slight asymmetry was condoned. Some candidates drew reciprocal curves in quadrants one and three. Parabolas and attempts in quadrant one only were also common. Candidates needed to demonstrate the intention that the curve was asymptotic to both axes.

Question 5

5 Show that the distance between the points (5, 2) and (11, –1) is $a\sqrt{b}$, where a and b are integers to be determined. **[3]**

Many candidates scored full marks on this question. Some resorted to a vector representation to calculate the components of the line section required. It was rare to see $\sqrt{45}$ unsimplified.

Question 6 (a)

6 An app on my new smartphone records the number of times in a day I use the phone. The data for each day since I bought the phone are shown in the stem and leaf diagram.

1 | 9
2 | 6
3 | 8 9
4 | 0 1 2 2 3 5 6 7 9 9
5 | 1 2 2 2 3 4 5 5 7 8 9 9
6 | 0 1 1 3 9

Key: 3|1 means 31

(a) Explain whether these data are a sample or a population. **[1]**

This question saw a range of responses. A lot of candidates declared 'population' without sufficient justification. Candidates needed to refer to the idea that all possible data had been collected and the words 'for each day since' should inform candidates that we are referring to all possible data. Some candidates misunderstood the question and referred to this being primary data (candidates should be reminded that sampling does often make use of primary data). Candidates should refer to the specific variables in the question (i.e. the number of times each day the phone is used since purchase) rather than 'it is all data'.

Key point call out (Identifying a population in context)

Populations can exist for both primary (self-collected) and secondary (collected by a third party) data. When justification is required, candidates should refer to the specific variables in the question.

Question 6 (b)

(b) Describe the shape of the distribution. **[1]**

Most candidates scored this mark, but some just said 'negative', which lacked detail and did not score. Candidates needed to refer to the type of skewness, but some candidates avoided the word 'skew' and instead stated things like 'bell-shaped', etc.

Question 6 (c)

(c) Determine the interquartile range. **[2]**

This proved to be the most successfully answered part of this question, with almost two thirds of candidates scoring both marks. Some candidates cost themselves time by re-listing the data in order (it had already been presented to them in ascending order). A common incorrect error was using the value of $\frac{n}{4}$ (i.e. 7.75), etc. instead of the $\frac{n}{4}$th value in the list.

Question 6 (d)

(d) Use your answer to part **(c)** to determine whether there are any outliers in the lower tail. **[2]**

This was the least successfully attempted part of this question. Some incorrect attempts involved median – IQR. Some candidates produced work but did not respond to the request to ‘determine’ as they did not reach a satisfactory conclusion about their work. A comparison with the lowest value (direct or indirect) was needed to score the second mark here.

Question 7 (a)

7 **(a)** Use the factor theorem to show that $(x-2)$ is a factor of x^3+6x^2-x-30. **[1]**

Just over half of the candidates scored this mark. Some did not give a concluding statement, while others resorted to using long division when the question specifically asked for the factor theorem to be used.

Question 7 (b)

(b) Factorise x^3+6x^2-x-30 completely. **[3]**

Candidates who responded to (a) correctly usually went on to score all marks in (b). Those who used long division in (a) were often able to score here too. It was rare to see an attempt at using the factor theorem in (b) without seeing it in (a) as well.

Question 8 (a)

8 The pre-release material contains information on Pulse Rate and Body Mass Index (BMI).
A student is investigating whether there is a relationship between pulse rate and BMI. A **section** of the available data is shown in the table.

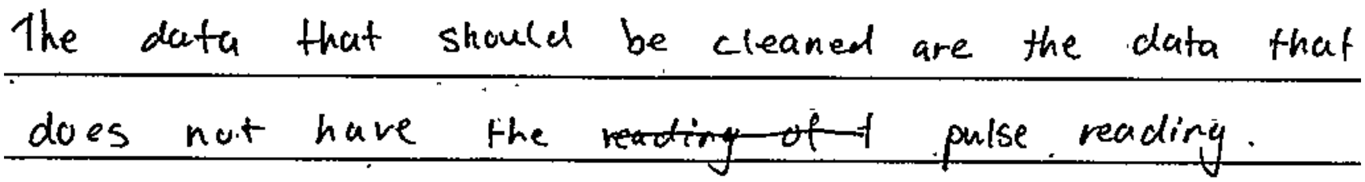
Sex	Age	BMI	Pulse
Male	62	29.54	60
Female	20	23.68	#N/A
Male	17	26.97	72
Male	35	24.7	64
Male	17	20.09	54
Male	85	23.86	54
Female	81	24.04	#N/A

The student decides to draw a scatter diagram.

(a) With reference to the table, explain which data should be cleaned before any analysis takes place. **[1]**

This question was often misunderstood and over half of responses were unsuccessful. Most candidates assumed that the data shown was all that they had to comment on, but this question stated that this was just a section from the available data (the LDS). Many candidates referred to specific data in this extract (see Exemplar 1 below), rather than focusing on the general set of data the extract was taken from (the LDS). Candidates needed to realise that any N/A data should be removed, not just the N/A data given in the extract here.

Exemplar 1



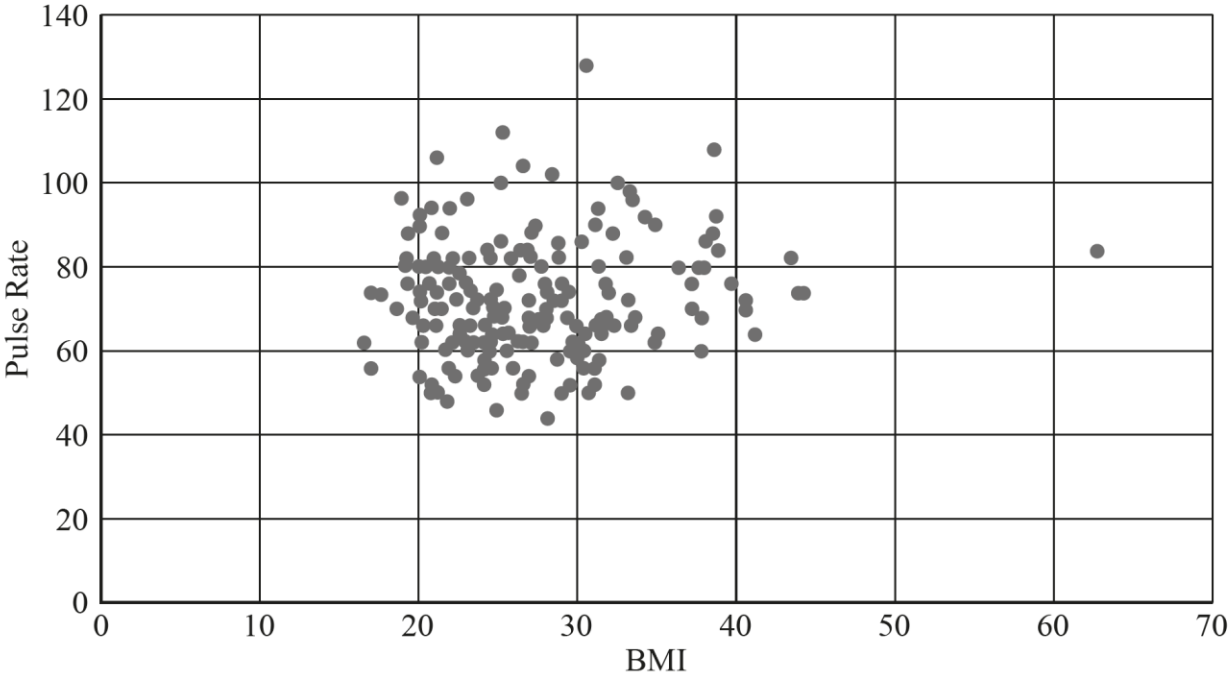
The data that should be cleaned are the data that does not have the ~~reading of~~ pulse reading.

This response has the correct idea but is too focused on the pulse data. There are also missing BMI data values in the LDS, so we need a comment about cleaning any missing data.

Question 8 (b)

The student cleans the data for BMI and Pulse Rate in the pre-release material and draws a scatter diagram.

Scatter diagram of Pulse Rate against BMI

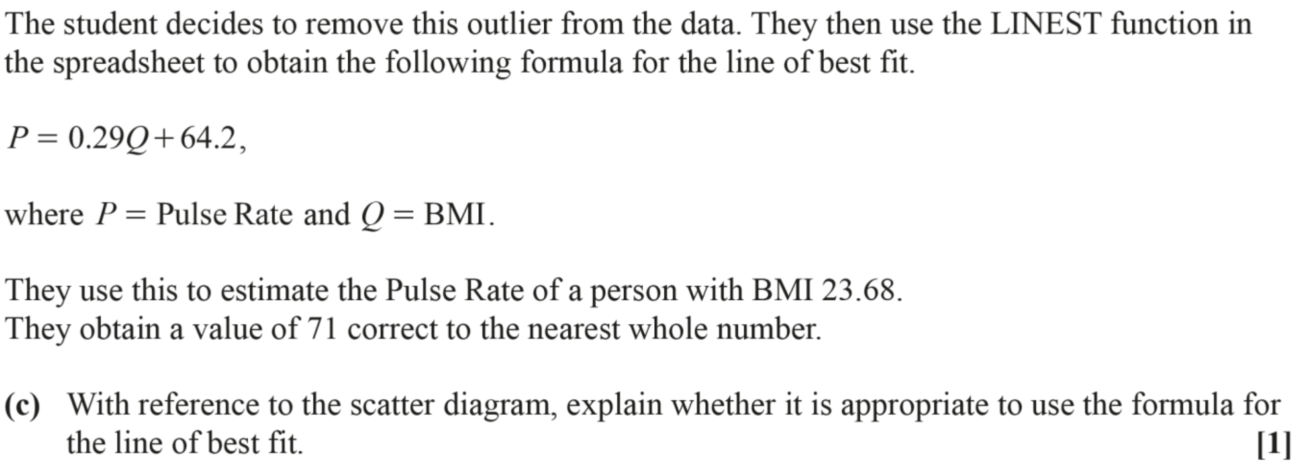


The student identifies **one** outlier.

(b) On the copy of the scatter diagram in the Printed Answer Booklet, circle this outlier. **[1]**

This question was the most successfully answered on the whole paper, with many correct responses seen. Some candidates opted for the value at approx. (31, 128).

Question 8 (c)



The student decides to remove this outlier from the data. They then use the LINEST function in the spreadsheet to obtain the following formula for the line of best fit.

$$P = 0.29Q + 64.2,$$

where $P =$ Pulse Rate and $Q =$ BMI.

They use this to estimate the Pulse Rate of a person with BMI 23.68.
They obtain a value of 71 correct to the nearest whole number.

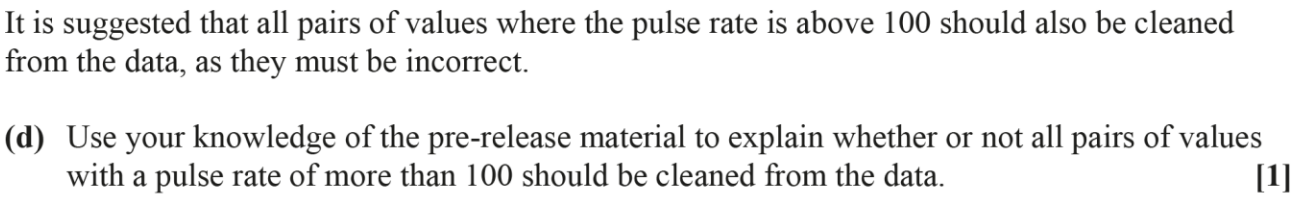
(c) With reference to the scatter diagram, explain whether it is appropriate to use the formula for the line of best fit. **[1]**

This question was not well answered. Comments were needed about the appropriateness of the linear model, based on the scatter diagram presented. Many candidates gave incorrect references to no or zero correlation. Some candidates referred to interpolation or extrapolation.

Misconception

? Scatter diagrams with values clustered do not necessarily show no/zero correlation, e.g. the PMCC could be close to 0, but not 0 itself.

Question 8 (d)



It is suggested that all pairs of values where the pulse rate is above 100 should also be cleaned from the data, as they must be incorrect.

(d) Use your knowledge of the pre-release material to explain whether or not all pairs of values with a pulse rate of more than 100 should be cleaned from the data. **[1]**

Many candidates answered this question based on supposition or deduction from what they thought was appropriate but made no reference to the LDS. This question specifically asked for candidates to justify their comment through knowledge LDS, but only a small number of candidates could do this successfully. The idea of commonality in the LDS was what was required here.

Question 9 (a)

9 The table shows the probability distribution for the discrete random variable X.

x	1	2	3	4	5
$P(X=x)$	0.1	0.3	q	$2q$	$3q$

You are given that q is a positive constant.

(a) Determine the value of q. **[2]**

This part proved very accessible to many. For most candidates, only errors in arithmetic prevented full marks.

Question 9 (b)

(b) Calculate $P(X \leqslant 4)$. **[1]**

This was not quite as successfully answered as part (a), but many correct values were seen.

Question 9 (c)

Two independent values of X are taken.

(c) Determine the probability that the sum of the two values is 3. **[2]**

This proved to be more of a differentiator, with some candidates not acknowledging that the requested outcome could happen in two ways, i.e. (2, 1) and (1, 2).

Question 9 (d)

Fifty independent values of X are taken.

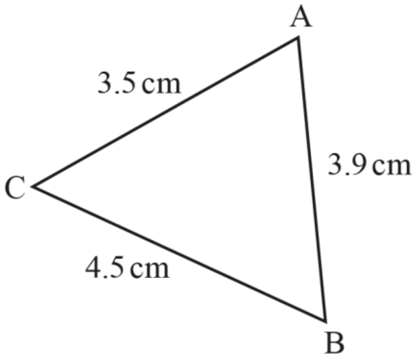
(d) Find the probability that a value of 2 occurs exactly 17 times. **[1]**

This part divided candidates, with almost equal correct and incorrect responses seen. Candidates had to first recognise this situation as a binomial distribution, then use their calculator effectively to obtain the correct value. Errors in rounding were rare. Among the incorrect attempts, using the incorrect distribution was common, e.g. mixing up n = 50 and X = 17.

Question 10

10 In this question you must show detailed reasoning.

The diagram shows triangle ABC, where $AB = 3.9\text{ cm}$, $BC = 4.5\text{ cm}$ and $AC = 3.5\text{ cm}$.



Determine the area of triangle ABC. **[5]**

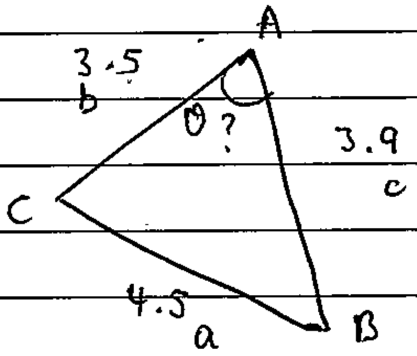
There were many successful attempts at this question, with strong work seen. Some candidates found rearranging the cosine rule to obtain an angle quite challenging. Many of the incorrect attempts were due to candidates incorrectly quoting the cosine rule formula. Other errors were caused by candidates struggling to pair the correct sides together when evaluating the area using the area formula. Some candidates used methods that made the question unduly complex, such as using the sine rule to find a second angle and using the area formula from there.

Exemplar 2

$a^2 = b^2 + c^2 - 2bc\cos(A)$ $\qquad \frac{a}{\sin(A)} = \frac{b}{\sin(B)} = \frac{c}{\sin(C)}$

$\frac{1}{2}ab\overset{\sin}{\cancel{\cos}}(A)$?

$4.5^2 = 3.5^2 + 3.9^2 - (2 \times 3.5 \times 3.9)\cos(A)$



$4.5^2 = 3.5^2 + 3.9^2 - (2 \times 3.5 \times 3.9\cos(A))$

$20.25 = 12.25 + 15.21 - (27.3\cos(A))$

$20.25 = 27.46 - (27.3\cos(A))$

$\frac{20.25}{27.46} = -27.3\cos(A)$

$\frac{\left(\frac{20.25}{27.46}\right)}{-27.3} = \cos(A)$

$\Rightarrow -0.02701\ldots$

$\Rightarrow \cos^{-1}(-0.02701\ldots)$

$\Rightarrow 91.54788\ldots$

$\text{Area} = \frac{1}{2}ab\cos(A) \qquad \Rightarrow 91.5^\circ$

$\Rightarrow \frac{1}{2} \times 4.5 \times 3.5 \times \overset{\sin}{\cancel{\cos}}(91.5)$

$\Rightarrow \underline{7.87}\ \text{cm}^2$

This candidate started with a correct cosine rule attempt but could not re-arrange successfully to find the correct angle. Later on, they used the area of a triangle formula incorrectly, using the incorrect sides for their included angle.

Key point call out: quoting a formula

Candidates should be reminded to quote any formula used before attempting to use it, as the method mark may still be given even if there are errors with substituting values. If no working or formula is shown and errors are made with substituting values, then method marks could be lost.

Question 11

11 In this question you must show detailed reasoning.

The equation of a curve is $y = 2x^3 + 9x^2 + 24x - 8$.

Show that there are no stationary points on this curve. **[5]**

Virtually all candidates were able to access some marks here, with many correct derivatives seen and most candidates then setting their derivative equal to zero and attempting to solve the quadratic. It was more common to see a discriminant attempted in this question, rather than an attempt to use the quadratic formula. Inconsistencies in working (e.g. having the wrong discriminant for their quadratic, etc.) or insufficient conclusions were the main cause of candidates losing marks here. This question stated detailed reasoning must be shown, so candidates should remember that every stage of working should be justified and an overall conclusion given.

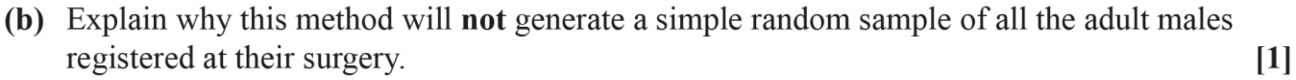
Question 12 (a)

12 Doctors are investigating the weights of adult males registered at their surgery. One week they collect a sample by noting the weight in kilograms of all the adult males who have an appointment at their surgery.

(a) State the sampling method they use. **[1]**

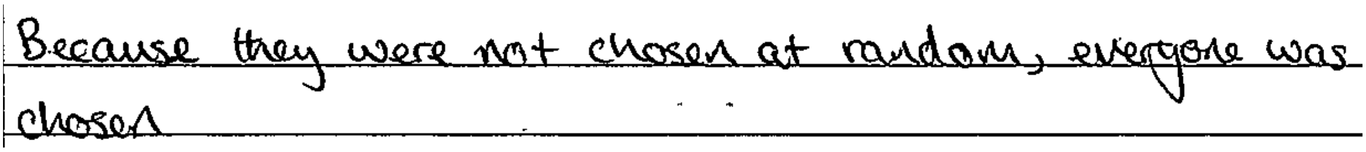
There were some varied answers given for this part. Responses such as 'cluster sampling' and 'quota sampling' showed that candidates were aware of these types of sampling, but perhaps that they had limited understanding of them.

Question 12 (b)


(b) Explain why this method will **not** generate a simple random sample of all the adult males registered at their surgery. **[1]**

This question proved to be challenging for many candidates. The majority were able to understand the idea that the selection of the adult males was not random, but most missed the nuance of the question that required an understanding of what is actually necessary to obtain a simple random sample. Responses needed to indicate that the sampling frame is incomplete and hence a simple random sample cannot be obtained. Most candidates referred to the idea that 'not all people will have an appointment that day' or similar, but they needed to also explain why this was a problem. Some candidates explained that a random method should have been used to select the males on that day but did not understand that this would still not generate a simple random sample.

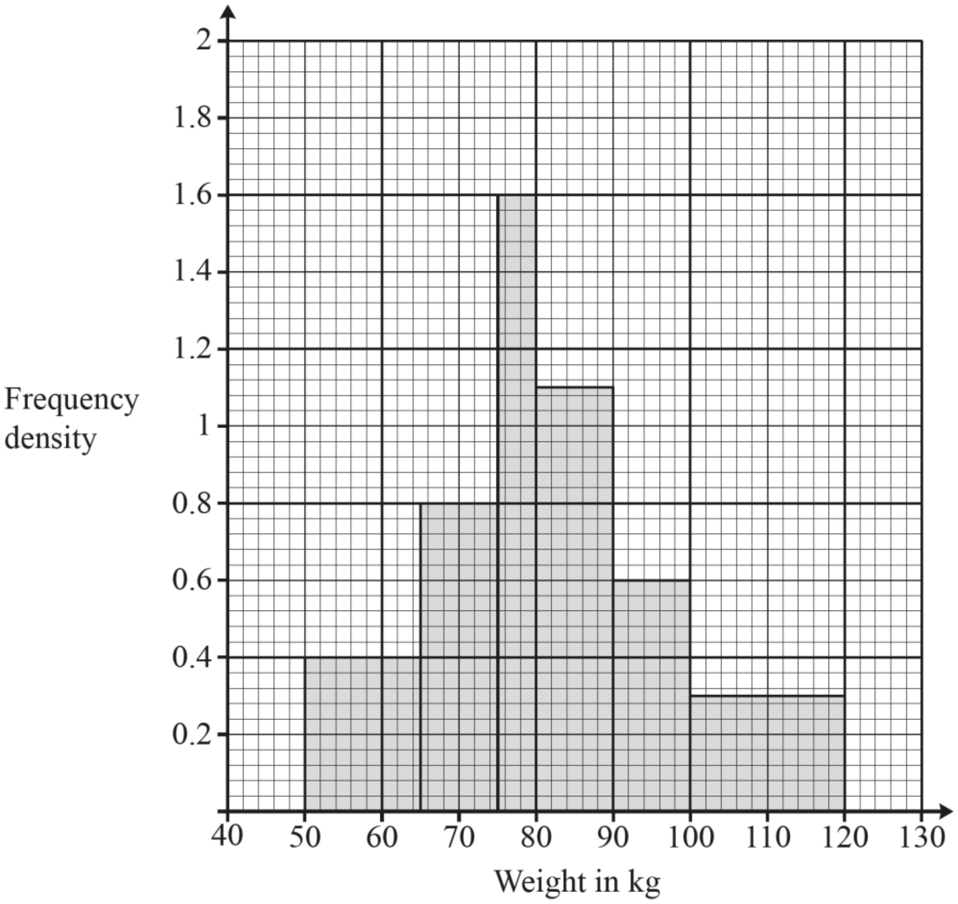
Exemplar 3


Because they were not chosen at random, everyone was chosen

This candidate has referred to the idea of non-randomness but has not commented on the idea that all males registered do not have an equal chance of selection (which is a fundamental for generating a simple random sample).

Question 12 (c)

They represent the data using a histogram.



An incomplete frequency table for the data is shown below.

Weight in kg	50 –	65 –	75 –	80 –	90 –	100 – 120
Frequency		8				

(c) Complete the copy of the frequency table in the Printed Answer Booklet. **[1]**

This part was answered very well by many, using the histogram to find the required frequencies.

Question 12 (d)

One of these patients is selected at random.

(d) Determine an estimate of the probability that he weighs either less than 60 kg or more than 110 kg. **[2]**

This was well attempted. Most candidates resorted to the table given, using proportions to find the necessary estimated number in each rage. Others used the histogram to find the areas of each bar. The most common error here was for incorrect arithmetic, or not adding their values for each range and dividing by the total.

Question 12 (e)

(e) Explain why your answer to part **(d)** is an estimate and not exact. **[1]**

This question proved to be a challenge for many, with a lot of candidates understanding the idea of why the values are estimates but being unable to articulate this clearly enough. Comments about not knowing the exact individual data were accepted, but some candidates offered incomplete responses, for example commenting on the fact that we don't know the specific data at one end of the distribution (less than 60 kg for example) and not the other, and not quite giving an overall comment that referred to the specific values extracted.

Question 13 (a)

13 In a report published in October 2021 it is stated that 37% of adults in the United Kingdom never exercise or play sport. A researcher believes that the true percentage is less than this. They decide to carry out a hypothesis test at the 5% level to investigate the claim.

(a) State the null and alternative hypotheses for their test. **[1]**

Many candidates continue to mix up *p* and *x* in these types of question, but most were able to state the hypotheses correctly here and score the mark.

Question 13 (b)

(b) Define the parameter for their test. **[1]**

Candidates continue to struggle with the idea of defining the parameter for a test. Some candidates referred to '*X*' or another variable here but did not define it fully. It was pleasing to see that most did not use the word 'number' (or 'amount', etc.). Candidates should also understand that correct statistical terminology is required, as well as that they should always define *p* appropriately in the context of the question.

Question 13 (c)

In a random sample of 118 adults, they find that 35 of them never exercise or play sport.

(c) Carry out the test. **[4]**

This was a standard 'hypothesis testing' question on binomial distribution and most candidates were able to score at least 1 or 2 marks. It was rare to see candidates attempting to compare the probability of a single value with 0.05 and it was also unusual to see a critical region attempt. Some candidates did fully correct work but were let down by insufficient conclusions that offered assertive statements such as 'this proves that...' or 'this shows that…', etc., while others did not firmly accept the null hypothesis. Candidates should also take care to refer to the variables in the question in their concluding statements.

Question 14

14 In this question you must show detailed reasoning.

The equation of a curve is $y = 16\sqrt{x} + \frac{8}{x}$.

Determine the equation of the tangent to the curve at the point where $x = 4$. **[7]**

This was a fairly standard AS Maths question and many candidates were able to score highly on it. Some candidates struggled with the indices here and were unable to find the equation of the line. Responses using the $y - y_1 = m(x - x_1)$ approach to finding the equation of the line were generally more successful than those using $y = mx + c$ and then attempted to find c. In general, the differentiation aspect of this question was well answered.

Question 15 (a)

15 A family is planning a holiday in Europe. They need to buy some euros before they go. The exchange rate, y, is the number of euros they can buy per pound. They believe that the exchange rate may be modelled by the formula

$$y = at^2 + bt + c,$$

where t is the time in days from when they first check the exchange rate.

Initially, when $t = 0$, the exchange rate is 1.14.

(a) Write down the value of c. **[1]**

This part was almost always correct. It was very rare to see an incorrect value here.

Question 15 (b)

When $t = 2$, $y = 1.20$ and when $t = 4$, $y = 1.25$.

(b) Calculate the values of a and b. **[2]**

Most candidates were able to set up two simultaneous equations using the given data, but a large minority struggled to solve them correctly. Common errors when two correct equations were obtained were missing or superfluous zeros, missing negatives, or adding/subtracting the equations incorrectly.

Question 15 (c)

The family will only buy their euros when their model predicts an exchange rate of at least 1.29.

(c) Determine the range of values of t for which, according to their model, they will buy their euros. **[3]**

The first mark for candidates setting their equation equal to 1.29 was very generous here and many scored it. Calculators were efficiently used to obtain the correct solutions for *t*, but many did not know how to put the solutions together to obtain the correct final answer. A diagram may help candidates in this type of quadratic inequality question.

Key point call out: sketch diagrams

Sketch diagrams can often help candidates when solving questions, particularly in the case of quadratic inequalities, calculus problems or those with multiple parts (e.g. coordinate geometry, where they need to be able to visualise the holistic situation and use previous work to arrive at the correct solution).

Question 15 (d)

(d) Explain why the family's model is not viable in the long run. **[1]**

This last part of the final question proved an elusive mark to achieve for many. Most candidates realised that the exchange rate would decrease, but many did not see that this would eventually mean a negative exchange rate. Again, a simple sketch of the quadratic model would have helped realise this. Another error was candidates not referring to the variable in the question; the model was about the exchange rate, so we would expect to see those words used in the explanation here.

Supporting you

Teach Cambridge

Make sure you visit our secure website **Teach Cambridge** to find the full range of resources and support for the subjects you teach. This includes secure materials such as set assignments and exemplars, online and on-demand training.

Don't have access? If your school or college teaches any OCR qualifications, please contact your exams officer. You can forward them this link to help get you started.

Reviews of marking

If any of your students' results are not as expected, you may wish to consider one of our post-results services. For full information about the options available visit the OCR website.

Access to Scripts

For the June 2023 series, Exams Officers will be able to download copies of your candidates' completed papers or 'scripts' for all of our General Qualifications including Entry Level, GCSE and AS/A Level. Your centre can use these scripts to decide whether to request a review of marking and to support teaching and learning.

Our free, on-demand service, Access to Scripts is available via our single sign-on service, My Cambridge. Step-by-step instructions are on our website.

Keep up-to-date

We send a monthly bulletin to tell you about important updates. You can also sign up for your subject specific updates. If you haven't already, sign up here.

OCR Professional Development

Attend one of our popular CPD courses to hear directly from a senior assessor or drop in to a Q&A session. Most of our courses are delivered live via an online platform, so you can attend from any location.

Please find details for all our courses for your subject on **Teach Cambridge**. You'll also find links to our online courses on NEA marking and support.

Signed up for ExamBuilder?

ExamBuilder is the question builder platform for a range of our GCSE, A Level, Cambridge Nationals and Cambridge Technicals qualifications. Find out more.

ExamBuilder is **free for all OCR centres** with an Interchange account and gives you unlimited users per centre. We need an Interchange username to validate the identity of your centre's first user account for ExamBuilder.

If you do not have an Interchange account please contact your centre administrator (usually the Exams Officer) to request a username, or nominate an existing Interchange user in your department.

Active Results

Review students' exam performance with our free online results analysis tool. It is available for all GCSEs, AS and A Levels and Cambridge Nationals.

Find out more.

Need to get in touch?

If you ever have any questions about OCR qualifications or services (including administration, logistics and teaching) please feel free to get in touch with our customer support centre.

Call us on
01223 553998

Alternatively, you can email us on
support@ocr.org.uk

For more information visit
ocr.org.uk/qualifications/resource-finder
ocr.org.uk
facebook.com/ocrexams
twitter.com/ocrexams
instagram.com/ocrexaminations
linkedin.com/company/ocr
youtube.com/ocrexams

We really value your feedback

Click to send us an autogenerated email about this resource. Add comments if you want to.
Let us know how we can improve this resource or what else you need. Your email address will not be used or shared for any marketing purposes.

I like this **I dislike this**

Please note – web links are correct at date of publication but other websites may change over time. If you have any problems with a link you may want to navigate to that organisation's website for a direct search.

OCR is part of Cambridge University Press & Assessment, a department of the University of Cambridge.

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored. © OCR 2023 Oxford Cambridge and RSA Examinations is a Company Limited by Guarantee. Registered in England. Registered office The Triangle Building, Shaftesbury Road, Cambridge, CB2 8EA. Registered company number 3484466. OCR is an exempt charity.

OCR operates academic and vocational qualifications regulated by Ofqual, Qualifications Wales and CCEA as listed in their qualifications registers including A Levels, GCSEs, Cambridge Technicals and Cambridge Nationals.

OCR provides resources to help you deliver our qualifications. These resources do not represent any particular teaching method we expect you to use. We update our resources regularly and aim to make sure content is accurate but please check the OCR website so that you have the most up to date version. OCR cannot be held responsible for any errors or omissions in these resources.

Though we make every effort to check our resources, there may be contradictions between published support and the specification, so it is important that you always use information in the latest specification. We indicate any specification changes within the document itself, change the version number and provide a summary of the changes. If you do notice a discrepancy between the specification and a resource, please contact us.

You can copy and distribute this resource freely if you keep the OCR logo and this small print intact and you acknowledge OCR as the originator of the resource.

OCR acknowledges the use of the following content: N/A

Whether you already offer OCR qualifications, are new to OCR or are thinking about switching, you can request more information using our Expression of Interest form.

Please get in touch if you want to discuss the accessibility of resources we offer to support you in delivering our qualifications.