Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

Summer 2022

Pearson Edexcel Level 3 Core
In Mathematics (7MC0) Paper 01

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Introduction

This paper was accessible to candidates at all levels as well as providing effective discrimination for higher achieving candidates. Solutions were generally well-presented and calculations were also generally well executed. Questions that required a written response involving an interpretation or explanation were attempted better than in previous series.

The source booklet was used well with the vast majority of candidates being able to retrieve the required information and apply an appropriate technique to the questions.

Candidates were well-prepared for topics such as mean from grouped data and Spearman's rank but not for standard deviation from grouped data or independence in probability. Most candidates also are still not confident using the formulae for geometric series. Centres need to ensure coverage of content as well as the problem solving aspects of the course

Report on Individual Questions

Question 1

Both the mean and modal score for this question was 7 marks, which suggests that it was accessible for all candidates but also presented a challenge.

(a) Very well answered by the majority of candidates. A minority divided by the 2016 sales figure rather than the 2015 figure and some failed to use a complete method to find the percentage increase by either failing to find the difference between the 2015 and 2016 figures or not converting their answer to a percentage. A significant number of candidates selected one value from 2015 and one from 2016 and were only able to score the method mark.

(b) (i) There were many correct responses which made reference to either four quarters/seasons in a year or seasonal trends. There were, however, many answers which failed to explain clearly why a moving average had been used. E.g. “more accurate”, “to see the data in more detail”.

(ii) Most candidates scored full marks here but a number calculated the average of the previous four moving averages rather than using the correct figures.

(c) Virtually all candidates were able to plot their two points correctly.

(d) (i) This was reasonably answered with many candidates able to give the correct years for each prediction and explain their answer. Of those who got the predictions the wrong way round the most common reason was that sales of bikes were already greater than 550 000 in Q4 of 2018.

(ii) Most candidates recognised that Q4 of 2018 gave the more reliable prediction and gave a valid reason. Those who had 750 000 as the prediction for their year here often justified it by saying sales of bikes were already greater than 550 000 in Q4 of 2018.

Question 2

The mean score for this question was 5.2 with the modal score being full marks which was achieved by just under 30% of candidates.

It was encouraging to see that a number of candidates were confident enough to enter the data into their calculators and give correct answers with no working. The obvious risk with this strategy is that use of incorrect midpoints and/or transcription errors could result in zero marks being awarded. Candidates should be encouraged to give answers to at least three significant figures. For example an incorrectly rounded, or truncated, answer of 3.6 with no working would have scored zero marks. However an incorrectly rounded, or truncated, answer of 3.6 following 3.67... would score full marks as a correct answer was seen prior to the incorrect one.

(a) (i) Very well answered by many candidates. Most were able to find the correct mid-points and carry out the required calculations accurately. Some candidates got as far as summing their fx but then divided by the sum of the midpoints getting an average of 415 days per week, which is manifestly absurd. Candidates would be advised to ask themselves, "Is my answer sensible?"

(ii) The standard deviation part was answered very poorly by the majority of candidates, with many failing to score any marks at all and many achieving values that didn't make sense in the context of the question. The most common error for those who made some progress was to find $(fx)^2$ instead of fx^2. As the formula for standard deviation is given in the formula booklet, centres would be advised to ensure that their candidates practice using it for data given in tables, both discrete and grouped.

(b) This part was answered much better than in previous series. Many students were able to give at least one correct comparison in context based on their mean and those who had calculated a standard deviation in (a)(ii) usually gave a second correct comparison, very often also in context.

Question 3

The mean score for this question was 5.3 marks with the modal score being 6.

(a) Two-thirds of the candidates gave a valid reason here. The common incorrect response referred to different modes of transport being used.

(b) (i) Despite the hints in (a) and the reiteration of the required numbers in the stem of the question, the majority of candidates used 206299 as the denominator and then "rounded" 0.03272... to 0.032.

(ii) Most were able to use the correct figures with only a very few then failing to write 0.148 as the final answer. As this is a "show that" question the final answer must be given as stated in the question. $\frac{998}{6751} = 0.148$ is fine but e.g. $\frac{998}{6751} = 0.14782$ ... without sight of 0.148 would only score the method mark.

(iii) The tree diagram was completed very well by the majority of candidates with only a very few failing to score at least one mark.

(iv) This was not well answered with the majority of candidates failing to score any marks. Some gave written explanations with no reference to figures and very few were able to give a complete solution. The most common source of a mark was using the probability tree diagram to calculate $\mathrm{P}(\mathrm{A} \cap \mathrm{B}) = 0.032 \times 0.148$.

(c) Over 70% of candidates failed to score any marks here. Many candidates wasted time recalculating the probabilities and many multiplied the probabilities along the branches of the probability tree (0.032 × 0.148 and 0.968 × 0.235). Many simply converted the probabilities to percentages and subtracted. Those who understood what was required by the question were usually able to score both marks but a few omitted a conclusion and some calculated 0.148 ÷ 0.235 to get 62.97..%

Question 4

Over 80% of candidates got the correct answer. There were some who failed to subtract to find the percentage not wasted and a sizeable number who worked with 33%, the percentage of all food produced globally that is lost or wasted every year.

Question 5

The mean mark for this was 5.3 marks with just over half of all candidates scoring full marks.

(i) Was done very well by the majority of candidates with most scoring at least three marks. The tied rankings caused less of an issue than in previous series but were still the main source of errors on this question. The majority of candidates reordered the waste column to run from 12 down to 1 with a very few having waste ranked high to low and GDP low to high, or vice versa. The formula was generally well applied though a number of candidates squared their value for $\sum d^2$.

(ii) The majority of candidates who achieved this mark used examples from the table rather than the value calculated in (i). Some failed to give a complete explanation only referring to either a country with a high GDP or a country with a low GDP. A number attempted an explanation of why rich countries wasted more food or stated that correlation didn't imply causation and thus scored zero.

Question 6

The mean mark for (a) was 2.7 and for (b) 0.7. However over a quarter of candidates scored no marks in (a) and over half scored no marks in (b).

(a) (i) The most common approach was to list the terms year by year with a number of candidates writing each value to 5 or more decimal places. Some rounded each answer and, therefore lost accuracy marks by the time they reached the value for 2030. Those who listed terms were more successful than those who attempted using the formula as these candidates often used n = 12 or n = 14. Virtually all attempted to compare their value for 2030 with 137.5 and give an appropriate conclusion.

(ii) This part was answered very poorly by the majority of candidates with most again attempting to sum the terms. A significant number started with 261.25 and thus scored zero marks. Many just gave a single term, often using n = 14. Very few attempted use of the formula but those who did virtually all used n = 14 correctly.

(b) This was attempted poorly with the majority of candidates not recognising that use of an Arithmetic progression was required. Of those who did recognise that an Arithmetic progression was required around half found the correct value with the rest either using n = 12 or n = 14.

Question 7

Only just over a fifth of candidates scored any marks on this question. The majority failed to use the proportion of food waste contributed by a consumer. Most commonly just the actual amounts of food waste per region were compared or the proportion each region contributed to the overall total with very many candidates failing to use a numerical argument at all. Those who did engage properly with the question generally scored very well with their mean mark being 3.4.

Question 8

The mean mark was 3.9 with just under a quarter of candidates scoring zero marks.

(a) This was the best answered part of this question. Most candidates were able to identify and use 18.4 and 15415 in their calculations and many scored full marks. Some divided 18.4 by 365 first and used rounded value of 0.05 when multiplying by 15415 achieving an incorrect answer of 770.75. Candidates should be reminded of the dangers of premature rounding. A significant number calculated the yearly footprint. Many tried to include the average water footprint of 2757 litres per person per day in their calculations.

(b) Not well answered in general by most candidates. Many were unable to deal with the ratio effectively and there was confusion with the units being grams per kilogram with division by 1000 often seen.

(c) As this part was reliant on the answers to (a) and (b) it was not surprising to see that it was poorly attempted. Though some who failed to answer (a) did then find the yearly water footprint for beef. Those who made any progress most often found the yearly water footprint for beef and soy but then calculated the percentage reduction using the water footprint for beef rather than the average water footprint per person. The most common full attempts were done by finding the yearly water footprints and calculating a target for Jon with the technically correct, but rather harsh, conclusion that Jon would not succeed.

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