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Examiners' Report
Principal Examiner Feedback

Summer 2017

Pearson Edexcel Mathematics in Context
Level 3 Core Mathematics (7MC0/02) Paper 02

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General comments

Solutions were generally well presented.
Good work on graphs generally.
Calculations are generally well done.
Students struggle with explanations and interpretations.
More care is needed when questions use different units e.g. pounds and pence.
Not enough thought is given to whether, or not, numerical answers are sensible in context.

Question 1

(b) Many correct calculations were seen for the rise in costs of the standard credit and prepayment methods, although some students unnecessarily calculated the payment increase given for direct debit. A number of students calculated one year's payment as a percentage of the other rather than looking for the percentage change and thus scored no marks. Although many students were able to make an acceptable observation, a number did not comment at all, or simply stated the figures ignoring the requirement to make a comparison.

Question 2

Most students recognised that having been given the mean and standard deviation for standard credit, and summary figures for non-standard customers, that calculating the mean and standard deviation was expected. A number of students only calculated the standard deviation, the more challenging of the calculations. Those who calculated the mean were generally able to comment that the average bill was higher for the home suppliers, but fewer were able to correctly state that a higher standard deviation indicated that the spread or variety of costs were larger often indicating incorrectly that a higher standard deviation meant bills were higher. A small minority miscounted the value of n and so lost accuracy marks.

Question 3

(a) Whilst most students recognised that finding the difference in the number of units was required, significant numbers lost marks mainly due to not using consistent monetary units with the unit costs being given in pence and the amounts received for electricity in pounds. Students need to be reminded to check that units are consistent and to convert as appropriate to make a valid calculation or comparison.

(b) This part of the question was normally well done. The value of P was usually found correctly, and this together with the two electricity totals was correctly substituted. A small number of students then only calculated the quotient, and failed to subtract from 100.

Question 4

(a) It was clear that a significant number of students did not understand the requirement of the question; many students compared half of the totals for each field type rather than weather type. A small number calculated each of the 4 groups as a percentage and a very small number of students did not attempt the question at all. Those who did perform the required calculation generally made the conclusion that pumpkins grow best in dry weather

(b) Very few students scored well in this part. Few were able to explain that $x + y = 1$ represented that pumpkins were grown in the two fields and that the fractions of each yield must add to the total yield. Many indicated $½ + ½ = 1$. Only a few students could formulate the correct equation that $31x + 6y = 24$, with many stating incorrectly that $x + y = 24$. Those students who answered (ii) correctly were generally able to solve their simultaneous equations correctly. Many students had inconsistent simultaneous equations and were unable to score any marks in (iii)

Question 5

(b) The majority of students were able to gain 2 out of the 3 marks available in this question. The final mark was often lost for misinterpreting that the pumpkin seed cost was a single cost, choosing to multiply this by 60 or 151 or for misreading that the costs related to one acre and the data previously given related to half an acre or for dividing by the total yield rather than the pumpkins that were fit to sell. It was unusual to note that some students did not feel that excessively large prices indicated that they may have miscalculated. Minimum prices of hundreds of dollars per pumpkin should be recognised as clearly incorrect.

Question 6

(a) Cumulative frequency diagrams were drawn accurately by the majority of students. Common errors included using the midpoint of the interval rather than the endpoint or drawing a line of best fit instead of a curve. Some students also chose to draw a frequency polygon instead, which then led to them losing valuable marks in the next part of the question.

(b) Students who didn't draw a cumulative frequency diagram scored no marks. Those who had drawn a cumulative frequency diagram often interpreted their scale incorrectly, but were able to gain one mark for using the correct method.

Question 7

Responses to all three parts of this question were mixed with respect to correct interpretation. Describing the regions within the context of the scenario proved difficult, but many students were able to use mathematical terms to explain what each set represented. In (ii) many simply quoted theoretical reasons why $A \cap B$ was equal to zero e.g. they are mutually exclusive rather than apply the given situation in the diagram, that circles A and B did not overlap. In (iii) some failed to read the question carefully interpreting the defective belts category as belts made by a machine D.

Question 8

(a) This was a demanding question on probability that was not done well by the majority of students. Those who scored marks in this question were able to use proportionality to find the total proportion of defective belts made by all 3 machines, but only a small number of students continued their calculations by dividing by the ratio as a whole to calculate the correct probability. Students who opted to use fractions were inaccurate when converting to decimal equivalents, stating that one third was 0.3 or 0.33, which then led to inaccurate calculations.

(b) Only a handful of students scored full marks on this question. The majority calculated the expected number of defective belts instead of working with the probability that a belt was not defective. Some students earned a mark for identifying 0.98 but then were not being able to proceed any further towards a correct solution.

Question 9

(a) Most students could use the information given to formulate at least one constraint that x lay between 70 and 150, and often they could state $x + y \leq 390$, but very few correctly formulated the $y \geq 2x$ constraint. Marks were often lost for the use of strict inequalities.

(b) Graphs were often well produced using these expressions, it was interesting to note that students who had failed to achieve marks in part a were then able to draw the correct lines to represent the inequalities required. Identifying the correct feasible region proved problematic for a number of students.

(c) The majority of students were able to successfully interpret and test points from their feasible region in order to try to find the maximum profit correctly. The final mark was often lost due to not identifying the maximum profit or for not stating how many bags were produced from each machine as the question required.

Question 10

Many students were familiar with finding a mean from grouped frequency and produced the correct value. The most common errors involved using endpoints rather than midpoints or only adding midpoints taking no account of frequencies. There were a small number of students who attempted to use cumulative frequency to find an estimate for the median.

Question 11

(a) Nearly all students were able to plot the correct type of graph in order to determine the type of correlation between the variables of the data set. A number of students lost marks for failing to label their axes correctly or using an inappropriate scale plotting at equidistant on the x-axis 17, 20, 25 etc

(b) Very few students could explain clearly why age was the explanatory variable.

(c) The choice of formula was the main cause for lost marks in this part of the question, with many using a method to calculate standard deviation or calculating the regression coefficient instead of the mean values for each variable. Some students used their calculators on the raw data – full marks were available using this method but no marks were scored if there was an error in the data entry. There were a rather high number of blank responses for this part.

(d) Nearly all students that attempted this part were able to correctly calculate one of the expected weekly earnings either using the given formula or by interpolation. Few students made appropriate comments regarding reliability.

(e) Very few students attempted this part of the question. Those who did often failed to interpret the gradient in context often simply stating that men's wages were higher than women's.

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