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Mathematics A (4MA0)
Paper 1FR

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Introduction

This paper allowed students to demonstrate their ability across the assessment criteria. Many students showed good algebraic skills but found identifying 3-D shapes challenging. Adequate working was usually shown although it is an area some students would benefit from improving.

Question 1

In part (a), many students were not able to identify a pyramid and, in particular, a cuboid. Some chose rectangle rather than cuboid and prism instead of pyramid. Most were able to recognise the cylinder in (ii). Part (b) was answer well but in a number of ways. For example, calculations such as $4 \times 3 + 4 \times 2 + 4 \times 1$ and $1 \times 1 \times 1 \times 24$ were seen.

Question 2

The overwhelming majority of students were able to write down the correct fraction in part (a) and shade in 25% of the shape in (b), change a fraction into a decimal in (c) and convert from a fraction into a percentage in (d)

Question 3

In part (a), almost all students were able to write down 2 whole numbers that multiplied to give 63 with most favouring 9×7 over 21×3. Likewise in part (b), there were very few issues writing down a multiple of 11 between 50 and 60. Most were able to identify a square number between 35 and 45 in part (c) although some wrote down 6 rather than 36. Students were slightly less successful at finding a prime number between 48 and 58 with 49 and 51 examples of incorrect responses.

Question 4

Drawing a bar chart in part (a) and working out the mean in (b) rarely provided students with a problem. In (c), most were able to work out the range, although some confused it with the largest value and the median and in (d) some students didn't simplify 35:15 or wrote down their ratio the wrong way round.

Question 5

In parts (a) and (b), students were usually able to round to one decimal place and to the nearest ten respectively, although the occasional response in (b) was rounded to the nearest hundred or thousand. Students were far less successful at estimating in (c), often failing to round each number to one significant figure, as instructed.

Question 6

Almost all students were able to find the 6^{th} term in part (a) and the next term of the sequence after 186. Similarly, most students were able to find the 20^{th} term in (c), usually by multiplying 6 by 20 although occasionally by listing the terms. Writing down a correct formula for T in terms of n in (d) proved to be more of a challenge with some attempting to write n in terms of T.

Question 7

Most students were able to identify the element with the lowest boiling point in (a). In (b) and (c), occasional sign errors were made, for example, -34 – 183 and 357 – 39.

Question 8

The overwhelming majority of students were able to write down the coordinates of B and C in parts (a)(i) and (a)(ii). Students were less able to write down the mathematic name of the quadrilateral in (c), some incorrect answers including rhombus, trapezium and parallel quadrilateral rather than parallelogram. They were far more competent at finding its area in (d) with most multiplying 4 by 2. In (e), a common error for the midpoint was (0, 1) rather than (0.5, 1).

Question 9

In part (a), almost all students were able to find the value of 9^4. In part (b), the square root or the cube of 6859 were sometimes found, rather than the cube root of 6859. In part (c), most students were competent at using their calculator but errors included finding $21.89 – 7.75 \div 0.65 + 2.85$ rather than $\frac{21.89-7.75}{0.65+2.85}$.

Question 10

There were only a small number of errors in part (a), including finding $2q$ and not q. Almost all students were able to write down the size of angle s in part (b) and although most could find angle t in part (c), one error included 68°. In part (d), students often explained why v = 68° by referring to sides FC and FD being equal as well as stating that FCD is an isosceles triangle. There were very few incorrect solutions in part (e)

Question 11

Most students correctly answered part (a). Of the small number of cases when this wasn't the cases, students still usually picked up marks in (b) even if they chose to use their answer from (a).

Question 12

Almost all students were able to solve $x - 9 = 15$ in part (a) and most could solve $\frac{3}{4}y = 12$ in part (b). In (b), some added, subtracted or divided both sides of the equation by $\frac{3}{4}$, others multiplied by $\frac{4}{3}$ and a few multiplied by 4 and then divided by 3. A number of students didn't know how to factorise a linear expression in (c) although some gained one mark for a partial factorisation. Likewise in part (d), some didn't know how to expand $(t - 4)(t + 5)$ with incorrect answers such as t^2 - 20 and -20.

Question 13

Most students appreciated that part (a) involved a reflection although some described it as rotational symmetry. Occasionally, the line of symmetry was incorrectly stated as $x = 1$ rather than $y = 1$. In part (b), some candidates lost one mark for having a parallelogram of the correct size but in the wrong position, the top left hand corner sometimes being at (0, 0) or (1, -1). The occasional student reflected shape **R** in part (c) and some rotated it 90° about the origin or another centre.

Question 14

In part (a), there were a number of cases where students lost marks. Some divided 683 by 163 rather than 163 by 683. Others rounded incorrectly leaving an answer of, say, 23.8 or did so to two significant figures giving an answer of 24. There was often insufficient method shown in (b). For example, working such as 1028 × (1 + 17.6%) and 1028 × 17.6% does not gain any credit. Incorrect responses included $\frac{176}{100} \times 17.6$ and $\frac{1028}{176}$.

Question 15

Those who had a grasp of probability were able to correctly answer part (a). In part (b)(i), some students worked out an estimate for the value of $5 prizes won. Part (c) proved more challenging but was still accessible to the more able students. An incorrect response occasionally seen was to multiply 40 by each probability and sum them.

Question 16

Most students were able to work out the area of the circle although a few used an incorrect formulae, such $2\pi r^2$ or $2\pi r$. There was a good awareness of Pythagoras' Theorem in part (b) although a small number added 6.5^2 to 10.5^2 rather than subtracting.

Question 17

Students, on the whole, showed an insight into prime factors in part (a) although a large proportion expressed 600 as a product of prime factors rather than as a product of powers of its prime factors. Others found a set of factors that multiplied to 600, often achieving 1 mark. In part (b), a number of students worked out $\frac{5^{12}}{5^2 \times 5}$ by giving their answer as 1953125 and not using an index rules. Others attempting to use such rules but did so incorrectly. The question was fully accessible to those who had a good grasp of these rules.

Question 18

Most students in part (a) were able to solve the inequality $e < 2$ although a few gave $e > 2$ as the answer. Similarly in part (b), some solved the $5 – 3e < 4$ correctly but then wrote $\frac{1}{3}$ on the answer line. Another incorrect response included $5 – 3 = 2$ followed by $2 < 4$. Part (c) proved inaccessible to many and even students who had some understanding of the question wrote their answer as an inequality rather than an integer.

Summary

- Students would benefit from learning the names of 3-D shapes.
- A large proportion of students didn't follow instructions in question 5 by failing to round each number to 1 significant figure when estimating.
- For percentage questions, students should show appropriate method, as described for question 14 above.

- Some students seemed unaware of the difference between a product of prime factors and a product of powers of prime factors.
- Some students were unaware that the inequality sign should be reversed when dividing both sides by a negative number.

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