AQA
Realising potential

GCSE
Mathematics

8300/1F: Paper 1 (Non-calculator) Foundation

Report on the exam

November 2020

Contents

Summary

Areas/topics/skills where students excelled:

- Place value
- Interpreting a pictogram
- Interpreting a Venn diagram
- Calculating the range
- Translating a shape
- Solving a linear equation
- Calculating annual earnings

Areas/topics/skills where students struggled:

- Changing the subject of a formula
- Circumference of a circle
- Standard form
- Factorising a two-term quadratic expression
- Arithmetic progression
- Probability
- Equation of a straight line
- Exact values for sin/cos/tan
- Arguing mathematically to show a statement is true

Multiple choice questions

Which questions did students find most accessible

Questions 1 and 2 were the best answered multiple choice questions, showing a good understanding of place value and a good ability to calculate the range of a set of numbers.

Which questions did students find least accessible

Questions 10 and 17 were less well answered. 4 was the most common incorrect answer on Question 10 and $y = x + 4$ was the most common incorrect choice on Question 17.

Which questions did students find most accessible

Questions 8 and 12 were the two questions that the most candidates attempted.

Which questions did students find least accessible

Questions 22 and 26 were the two questions that the fewest candidates attempted.

Common misunderstandings

Question 22

Most students were able to correctly substitute the given value and accurately calculate the figure contained within the bracket. The majority of students then added the 273 before attempting to multiply by 5 and divide by 9. Quite often the $\times \frac{5}{9}$ became $\times \frac{9}{5}$ or × 0.45.

Individual questions

Question 5

This question was well attempted with the students understanding the need to calculate the area of each shape and then simplify their resulting ratio. Shape A mostly had the correct area found with Shape B having a common wrong area of 15. The students who counted squares instead of attempting to calculate the compound area of Shape B were usually more successful.

Question 6

Both parts of this question were very well attempted. In part (a), the most common wrong answer was for Samir to be the winner, due to the misconception that the greater number of seconds must be best and therefore make him the winner. The other common misconceptions were that there are 100 seconds in a minute or 2½ min being 2 min 50 seconds. In part (b), for those that didn't quite calculate the correct day and time, most achieved one or the other. Some students lost marks on this part, due to incorrect time notation, eg 15.00pm.

Question 7

The vast majority of students were able to score on this question. Without their calculator, they found 43×8 easier to calculate than $234 \div 6$. The division often ended up as a decimal answer which then proved problematic in the subtraction. The decimal parts were often ignored and simply put back after the whole numbers had been correctly subtracted.

Question 8

In this pictogram question, the students were able to use the key successfully in parts (a) and (b). In part (a), the most common wrong answer was for students to calculate the total number of people who had visited the cinema. For some in part (b), the subtraction of the two rows went awry, but the subtraction method was usually more successful than those who tried to work on the part boxes left after the adults row had ended. Part (c) was well attempted but when the students were unable to identify what was wrong, they often fell back upon the idea of "wrong title", "x and y axes should be labelled" or "shouldn't be gaps between the bars". Those who identified the error on the bar chart were able to communicate it, effectively.

Question 9

Students responded well to this question, demonstrating a secure knowledge of the arithmetic skills necessary, applying them with a high degree of accuracy. Most candidates remembered to make a decision, based on their calculation, as to whether or not Harry would pay income tax. The most common method seen was to add 4×1200 to 7600 and base the decision upon that answer.

Question 10

This question, although well attempted, was not well answered. The most common incorrect answer was 4 but the least common, incorrect response (the answer of 2) was still given by almost 16% of students, showing a good spread of responses across the four options.

Question 11

Part (a) of this question was a good discriminator, with a good split of marks. In part (b), the most common error, was to write the 0 above the 3 but not carry the 3 forward. This resulted in an answer of 0.13

eg $5\overline{)3.65}^{0.13}$

Question 12

Part (a) was very well answered but the usual error was to just choose the 21, and not to add on the 8 from the Venn diagram intersection. Part (b) mostly saw the correct number being identified. This mark was not scored by students gave their answer as a ratio or a fraction. Part (c) was not answered as well as parts (a) and (b). Those that were correct were rarely given as percentage or a decimal. The mark was most often lost due to incorrect presentation of $\frac{17}{50}$. Frequent, incorrect answers were 17, 17%, $\frac{17}{33}$, 17 : 33 or 17 : 50

Question 13

This translation question was well attempted with the majority of students scoring at least 1 mark out of the 2. When one mark was lost, it was because of a counting error when moving to the left, or up. When both marks were lost it was usually because the shape had changed - often enlargements or the sloping side had become a slope of $\begin{pmatrix}1\\1\end{pmatrix}$ instead of a slope of $\begin{pmatrix}1\\2\end{pmatrix}$

Question 14

The linear equation in part (a) was solved very well. Due to the integer answer, a trial and improvement system worked well for some candidates but the flow chart method was rarely successful because the operators were not switched, or were used in the wrong order. Although there were many candidates achieving full marks, there was not always a formal approach seen. Responses varied greatly in part (b) with students able to simplify 2 × 8a and $\frac{15a}{3}$ but then unable to correctly collect the like terms. A correct answer of 13a + 2 often became 15, $15a$ or $15a^2$.

Question 15

This question saw a good spread of marks and it was pleasing to see so many get as far as to correctly calculate that the square had a side of length 7. A large proportion unfortunately then went on to multiply by 4 or 10 instead of squaring. Students who adopted the approach of dividing by 4 initially, then tried to finish by squaring the 17. This method was less successful than subtracting 40 to start.

Question 16

Students coped well with the rows of the table not totalling 100. In each part, a common mistake was to have a denominator of 150 but part (a) still allowed a mark for correct simplification from that denominator. The most common wrong answer in part (b) was when students presented their probability as a ratio again. In part (c), whilst most students could find that 30 students travelled to school by car, this then often translated into 30%, or the student went on to calculate 30% of 150.

Question 17

Students most commonly answered with $y = x + 4$, seeing the connection between that equation and the point (2, 6) that was given.

Question 18

Many students started off well in part (a), correctly stating or calculating that 10% of 80 is 8. From there build-up methods went awry and the knowledge to multiply the 8 by 11 was not evident. Those who knew that one method would be to calculate $\frac{110 \times 80}{100}$ were often unable to complete the calculation without their calculator. Part (b) saw reasonably similar amounts of candidates scoring and not scoring. The most common, incorrect answer was $\frac{4}{7}$

Question 19

The majority of students attempting part (a) did not understand that the two probabilities were equal and made no start to set up working from $\frac{2}{5}$ or a similar ratio approach. The most common error was to do 30 ÷ 3, using the 30 counters in Bag X and the 3 green counters in Bag Y. Part (b) was more successful with many students finding the necessary 33. Those who then didn't score the second mark had usually answered with $\frac{2}{33}$ or $\frac{2}{35}$

Question 20

Graph B was identified correctly more than Graph A. The usual incorrect answers for Graph A were strong positive or weak negative.

Question 21

–2, 10 was the most common incorrect answer given for part (a), by students who treated the geometric progression as an arithmetic progression. Part (b) was not well answered. $10p$ was the most common third term seen but even then few students were able to demonstrate the necessary skill of forming and solving the equation. Trial and improvement was not usually a successful method here, due to the nature of the non-integer solutions that the incorrect third term usually brought.

Question 23

The most successful method was to begin with 3 × 0.275 although the resultant answer was often incorrect and very rarely divided by 10. Those who attempted 33 ÷ 400 soon faltered.

Question 24

More successful candidates began by dividing £2400 by 8 to find the deposit and monthly payment amounts. Once these values had been found, one or other was often then multiplied by 6. Those who started by dividing by 6, often scored nothing further that the first mark.

Question 25

Most students were not successful on this question, even in part. Those who answered with a partial factorisation usually gave $x(2x+6)$ rather than $2(x^2+3x)$. Incorrect algebraic notation was often seen on these partial factorisations, for example $x(x2+6)$ but this did not lose the mark gained by the partial factorisation. Those who did not attempt to factorise gave answers such as $2x^2+6x=8x^2$ or $2x^2+6x=4x+6x=10x$

Question 26

The mathematical communication required from part (a) of this question was well done by a good number of candidates, but many students did not understand where to start in order to show what was necessary, even if they could identify the 3 was the missing multiplier. They tried to get the three from 7 + 2 = 9, 21 + 6 = 27, 27 ÷ 9 = 3. The most common answer given for part (b) was 21π, coming from an attempt to find the circumference of the larger circle but using the radius instead of the diameter. Often the perimeter of the smaller shape was not attempted, although some areas were calculated.

Question 27

Most candidates on this question either calculated the length of the vertical using Pythagoras' Theorem, worked with the numbers in the question to give 90 – (18 + 9) = 63° or assumed that the triangle was isosceles, giving 45° as their final answer. Those who correctly identified that cosine was needed and had $\frac{9}{18}$ did not know that $\cos^{-1}\frac{9}{18}$ is 60°.

Question 28

This rearrangement did not score highly. The most common approach was simply to switch over the c and d in the given equation. Students who attempted some sort of algebraic rearrangement usually moved the 2 before the 3, giving an answer of $c - 2 \times 3 = d$ or $d = 3(c - 2)$. There was little success seen when the flow chart method was used.

Question 29

These final questions on the paper were reasonably well attempted. In part (a), often the fault was to give 36 before the power of ten, rather than the 3.6 it needs to be for standard form. Those who could not remember how to put a number into standard form offered the number written as words. Part (b) saw a similarly valiant attempt for the very final question with roughly the same number of candidates scoring the mark. Common incorrect answers were 92 000, 0.92 or 89 from 92 – 3.

Further support

Mark ranges and award of grades

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