GCSE
MATHEMATICS

8300/3F: Paper 3 (Calculator) Foundation
Report on the Examination

8300
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General

The majority of students found the paper accessible and attempted most of the questions. The work was generally well presented with working shown on most scripts. Arithmetic errors caused problems for some students who had otherwise engaged with a question and decided not to use a calculator. Some students either did not use or show the working from their calculator.

Topics that were well done included:

- ordering numbers
- proportion problem
- pictogram
- multiples
- best buy
- prime numbers
- metric imperial conversion
- systematic listing
- substitution
- compound measures and time problem

Topics which students found difficult included:

- angle problem
- function machine
- pie chart
- enlargement fractional scale factor
- simplification
- factorisation
- positive and negative roots
- limits
- algebraic argument
- density
- set up and solve an equation
- compound interest
- mean and ratio
- equation of a line
- trigonometry

Question 1

This question was well answered by the majority. 200 was the most common incorrect answer.

Question 2

This question was well answered by the large majority. 3 and –3 were the most popular incorrect choices.

Question 3

This question was well answered by the large majority. $\frac{21}{4}$ was the most common incorrect answer.

Question 4

This question was well answered by the large majority. $\frac{y}{x}$ was the most popular incorrect choice.

Question 5

This question was reasonably well answered by the majority. Students who changed the values to decimals had most success. Errors were prevalent with conversion attempts to fractions with common denominators other than 40, and in converting $\frac{31}{40}$ to a percentage. Some students mixed decimals and percentages while others gave their answer in reverse order.

Question 6

Part (a) of this question was well answered by the majority. Most students correctly achieved 11.20 from 0.8 × 14, but some calculated 11 ÷ 8.8 and then incorrectly multiplied this by 14. A correct calculation and answer was sometimes written using incorrect money notation as 11.2.

Part (b) was not very well answered. A correct decision usually followed recalculating the adjusted cost and comparing with part (a). Common misconceptions were that if more than 8 tracks were downloaded then all the tracks would be 5p less. Another was that, since some tracks cost more and some cost less, it would balance out to keep the cost the same. Some students used the cost of 6 tracks as 5p less in total rather than 5p less for each track.

Question 7

This question was well answered by the majority. The large majority of students gained the first mark by showing 9 + 10 + 3 = 22 but a misconception by some was to leave this as their final answer. Common errors were seen in achieving 27 and 15 where students used a method with initial calculations of 4.5 × 3 or 1.5 × 5. Some students had difficulty with 27 + 40 + 15 with incorrect answers of 72 or 92.

Question 8

This question was a good discriminator and was reasonably well answered. The most frequently seen method used addition trials, although there were many unevaluated trials. Often the only evaluated trial seen was the correct one as the final answer. Incorrect trials had to be correctly evaluated and recorded when using a trial and improvement method.

Question 9

This question was a good discriminator and was reasonably well answered. The most common errors were £115 from dividing a pack of 3 rolls with 34.5 ÷ 3 = 11.5 and 11.5 × 10, or £117.50 from dividing a pack of 5 rolls with 58.75 ÷ 5 = 11.75 and 11.75 × 10. These incorrect answers were seen with £116 in working from a correct method.

Question 10

This question was not well answered. A common incorrect answer was 65 where students incorrectly assumed *AED* was an isosceles triangle. Some students also had difficulty after correctly calculating angle *DEC* as 130°, often incorrectly assuming angle *DEA* as 65° and then concluding 360 – (60 + 65 + 130) = 105 or 360 – (130 + 65 + 130) = 35 as incorrect answers.

Question 11

Part (a) was not well answered. The most common incorrect answer was + 10. Some students incorrectly showed 2 alone in the answer box instead of +2.

Part (b) was also not well answered. The most common incorrect answers were $y = (x + 4) \div 2$ and $x = y - 4 \times 2$.

Question 12

This question was well answered by the large majority. 14 was the most popular incorrect choice.

Question 13

This question was reasonably well answered. Common incorrect answers included 46 and or 49 alongside correct prime numbers.

Question 14

This question was a good discriminator and was reasonably well answered. Common incorrect answers included correct use of 3115 × 0.028 = 87.22 with no further work, 3115 ÷ 6.23 = 500 followed by 500 ÷ 0.028 = 17 857 or 3115 ÷ 0.028 = 111 250 with no further work.

Question 15

This question was not well answered. $\frac{1}{3}$ = 30% was the most common incorrect answer.

Question 16

Approximately half of the students gave the correct answer. Kite was the most popular incorrect choice.

Question 17

Part (a) was very well answered by the majority, with correct answers using exactly ten options or exactly sixteen options. Common incorrect answers occurred with omissions when a systematic listing approach was not used.

Part (b) was not very well answered. The large majority of students correctly completing the sector angles also correctly labelled the sectors. There were many pie charts drawn without calculations and many students did not connect 180 scoops with 360˚ to achieve 1 scoop = 2 ˚. A common error was to complete only half the pie chart using 45˚, 75˚, 50˚ and 10˚.

Question 18

This question was not very well answered by the majority with a significant number of non-attempts. The most common errors were to use an enlargement scale factor 2 instead of $\frac{1}{2}$, applying the correct scale factor to only the base or height and drawing the enlargement out of tolerance without using the grid.

Question 19

Part (a) was not very well answered. Many errors were made by incorrect combinations of terms and also further incorrect algebraic simplification followed correct combinations of terms. Common errors included $2a^2 + 15a - 1 = 17a - 1 = 16a$ and $3a^2 - a^2 = 3$

Part (b) was not well answered by the majority with a significant number of non-attempts. The many non-attempts and those attempts without factorisation showed a misunderstanding of how to factorise a two term quadratic expression. A common error was to use a partial factorisation such as $2y(12y - 10)$ or $4(6y^2 - 5y)$.

Question 20

This question was not well answered by the large majority with a significant number of non-attempts. The most common error was to only show the positive root $x = 14$ ignoring the negative root $x = -14$. Another common error was $x = 198 \div 2 = 98$

Question 21

This question was not well answered by the large majority with a significant number of non-attempts. The most common error was to only add the two original amounts with an answer of 15.50. Other common errors were to use only a correct limit for £9 to the nearest pound with a misconception in applying a limit for £6.50 to the nearest 50p, 6.99 being the most common incorrect limit.

Question 22

Part (a) was well answered by the majority with a significant number of non-attempts. Common incorrect answers were 25 from 5^2 with omission of the next stage or 2.6 from not using a calculator and incorrectly applying BIDMAS to show $25 - 12 \div 5 = 2.6$.

Part (b) was not well answered by the very large majority and there were a large number of non-attempts. Many students did not give a full algebraic argument for why T is always positive when n is negative, with few referring to the two terms n^2 or $\frac{12}{n}$. Common incorrect explanations included 'a negative multiplied by a negative gives a positive' without particular reference to any term. Some students used an incorrect approach with number based substitution examples.

Question 23

This question was well answered by the majority. The most common errors were based on incorrect conversion between time notation and decimals eg 1.5 hours and 1.30 or stating times without showing working, eg after identifying 4.30 pm then incorrectly stating four and a half hours were left until 8 pm.

Question 24

This question was not well answered by the large majority and there were a large number of non-attempts. The majority were unable to use the formula $D = \frac{M}{V}$ correctly. The most common errors

were 48 × 8 = 384 for the density of J and K, with 384 ÷ 78 = 4.92 for the volume of K. The majority of students were unable to state the correct units for density.

Question 25

This question was not very well answered and there were a large number of non-attempts. Setting up and solving an equation often led to the correct answer. However, a very large majority of students did not use an algebraic approach. The most common approach was to use trial and improvement with the addition of three lengths; however these were often not evaluated. The most common error involved trials where the length of *PQ* was doubled rather than *PR*, with *PQ* = 40, *PR* = 50 and *QR* = 80 often seen.

Question 26

This question was not well answered by the very large majority and there were a large number of non-attempts. Offer 1 was generally the best attempted compound interest calculation with a correct value of £6365.40. A common misconception was to give a reasoned answer that 3% was the average of 1% and 5%. A common error was calculating simple interest separately for each year, eg Offer 1 £180 for year 1 and year 2 and for Offer 2 £60 for year 1 and then £300 for year 2.

Question 27

This question was not well answered and there were a large number of non-attempts. Most students found the combination of statistics and ratio difficult. Some students were able to calculate the mean of set A but were unable to proceed further by working with the ratio 3 : 8 to calculate the mean of set B.

Question 28

This question was not well answered and there were many non-attempts. Some students identified 4 as the coefficient of x but many incorrectly used a gradient of 5 or the y-intercept as 23, while others used 4, 5 and 23 within incorrect calculations.

Question 29

This question was not well answered. 13 cm and 14 cm were the most popular incorrect choices.

Question 30

This question was not very well answered by the large majority and there were a large number of non-attempts. Many students correctly identified the sine ratio but did not progress further. The most common errors were $\sin\left(\frac{13}{16}\right)$ or $\sin = \frac{13}{16}$ without recovery, followed by an answer of 0.8125, $\sin^{-1} = \frac{13}{16}$ and incorrectly using Pythagoras with an answer of $\sqrt{87}$ or 9.3.

Use of statistics

Statistics used in this report may be taken from incomplete processing data. However, this data still gives a true account on how students have performed for each question.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.