AQA

GCSE
Mathematics

8300/3H Paper 3 Higher
Report on the Examination

Specification 8300
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General
Most students completed the paper in the time allowed with very few questions having a significant number of non-attempts. Some of the topics that were new to this specification and questions that had an element of novelty were generally not well answered. The quality of presentation of work varied significantly. Some students were not able to recall relevant formulae that were needed to answer some questions.

Topics that were well done included:

- column vector addition
- relative frequency
- error intervals
- expectation.

Topics which students found difficult included:

- ratio problem
- index notation
- quadratic sequence
- turning point problem
- interpreting speed from a distance-time graph
- area problem using algebraic expressions for lengths
- proof

Question 1

This question was well answered. The most common incorrect answer was $\begin{pmatrix} -5 \\ -1 \end{pmatrix}$.

Question 2
This question was well answered. The most common incorrect answer was 3.

Question 3
This question was well answered. The most common error was to invert the fraction giving $w = \frac{y}{2x}$.

Question 4
This question was not well answered. The most common answer was 150°, with slightly more responses than the correct answer of 210°.

Question 5
This question was well answered. Many students deduced the number of 'heads' to be 300 for a relative frequency of 0.6 and then obtained the total of 500.

Question 6
This question was a good discriminator but responses were often incomplete referring to $3x$ rather than x.

Question 7
Part (a) of this question was well answered. The most common error was to give 6.49 for the upper limit. Part (b) was not well answered with the most common incorrect answer being 6.5 + 4.5 = 11. Another quite common response was 6 + 4 = 10.

Question 8
Part (a) was quite well answered but a significantly high number of students gave "Must be true" as their answer. Part (b) was quite well answered. The most common incorrect answer was "Could be true".

Question 9
Part (a) of this question had the highest proportion of fully correct answers on the paper. Almost all students worked out at least one correct calculation. A common error was to change $\frac{2}{3}$ to 0.6.
Part (b) was generally well answered although some students gave the probability that a student chosen at random studied French. Other students used probabilities giving $\frac{1}{3} + \frac{2}{5} = \frac{11}{15}$.

Question 10
Part (a) of this question was quite well answered by a majority of the students. Common errors included not linking the corresponding angles to set up an equation, incorrectly starting from $2x + 10° + 3x – 20° = 180°$ or trying to solve an equation in more than one variable. Part (b) proved challenging for most students with only a small minority successful. Many continued with the assumption that the lines were parallel and gave $3x – 20 = 60$. Many then stated that y was 120°. A few obtained $x = 25°$ but made no further progress.

Question 11
Almost all students attempted this question but responses were often poor. Many students could not deal with the problem solving nature of the question and many incomplete methods were seen. 20 : 8 leading to an answer of 28 was quite common. Other common responses were red – 6, blue – 4.5 leading to an answer of 10.5 and red 5 × 4.5 = 22.5 sometimes with a final answer of 22.5 and sometimes with a further 4.5 added to give 27 litres.

Question 12
This question was not well answered although many worked out one correct value. Common responses were $a = 16$, $b = 5$, $a = 4$, $b = 5$ with $a = 4$ often coming from 16 ÷ 4.

Question 13
This question was quite well answered, but students either knew a correct method and reached the correct answer or used a completely incorrect method and made no valid progress, starting with 1.58 –1.52 = 0.06. Correct answers were usually very well presented.

Question 14
The correct answer was the most popular but similar numbers of responses were given to all but the first option.

Question 15
Both parts of this question were generally well answered with part (b) having a slightly higher success rate.

Question 16
This question was quite well answered. Most students correctly obtained £13 500 for the end of first year value. Those students who used the multiplier of 0.88 were generally more successful than those who found 12% of each year and subtracted, many of whom calculated an incorrect number of years, usually one too few or one too many. Again build-up methods were rarely successful.

Question 17
Many fully correct responses were seen to this question but the multi-step nature of the question meant it was very challenging for the majority of students. Many of the errors appeared to come from a mixing up of units. Weaker students gave incorrect time conversions using 1.36 hours for 1 hour 36 minutes or having obtained 112 miles for the second stage, then added 9 miles for the first stage to give 121 miles and then divided this by 40. A significant number of students attempted a build-up method, often splitting the 1 hour 36 minutes into 1 hour, 30 minutes and 6 minutes. Build-up methods often included arithmetic errors, suggesting many of these students had not used a calculator.

Question 18
This question was not well answered with only a small proportion of students identifying the incorrect label on the y-axis. Many students referred to incomplete scales on one or both of the axes, or stated the graph either should touch both axes or should not touch the y axis.

Question 19
The question was quite well answered by the more able students who gave concise and elegant solutions. Most of these students realised that angle *FDE* was 24°, went on to give the base angles of triangle *DFC* as 78° and then worked out 102° ÷ 3. Common incomplete solutions used the assumption that triangle *ABF* was isosceles without giving the reasons, or the incorrect assumption that *AB* was parallel to *FE*. Some students assumed that either angle *FAE* or angle *ABF* was a right angle. A few stated that angle *BFC* was 48° having assumed that *F* was the centre of the circle.

Question 20
This question was generally not well answered. Some students simply calculated 525 – 78 = 447. Students had more success with the bounds for 78 kg than for the bounds of 525 kg which were often given as 520 and 530 or 524.5 and 525.5. Many who gave the correct bounds then chose the wrong calculation to carry out, such as 527.5 – 78.5.

Question 21
This question was quite well answered. The most common incorrect answer was $x > -2.5$ or $x < 1$.

Question 22
The new topic was not well answered. The most popular approach was to use the difference method but many did not progress further than giving the second differences as 8 and correctly giving the first term.

Question 23
Responses to this question were generally poor. There were frequent attempts at a gradient such as –10 ÷ 5 = –2 and frequent substitutions of $x = 5$ and $y = -10$ at the same time, giving $-10 = 5^2 + 5b + c$. It was quite common for those who started correctly to introduce a sign error so that $b = 3$ was then stated.

Question 24
Very few correct methods were seen for this question with most students not drawing a tangent. Of those who did draw a tangent most were then successful but some calculated the reciprocal of the number required and some misread one of the scales. Weaker students often just read off at 1 second to give answer of 8 for the speed.

Question 25
Part (a) was quite well answered, although some students did not show the complete method which is essential when the answer is given. Part (b) was not well answered although many obtained the information required to find the angle *ECM*. Many did not use the fact that angle *EMC* = 90° or used an incorrect trigonometrical ratio. Part (b) was the least attempted part on the paper.

Question 26
Responses to this question were generally poor. Many students did not set out the working clearly and consequently many of the errors came from incorrect algebra notation, for example, missing out the brackets in the expression $9 – (3x + 1)$ leading to $10 – 3x$. Students who managed to put together a correct expression for the area often either did not simplify it correctly or did not equate it to 65 cm^2. A few students used trial and error but were rarely successful.

Question 27
Very few correct responses were seen as this question proved to be too challenging for almost all students. There were very few attempts to complete the square and very few attempts to use the quadratic formula. A few students stated that x^2 is always positive but made no further progress. Very few used a graphical approach. A common error for some students was to try to use an odd/even approach and some others tried to factorise the expression.

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.