



Countdown to your final Maths exam ... part 6 (2019)

Markscheme & Examiners Report

- Q1. Students had little success with changing the subject of this formula with a few managing the first step, invariably to subtract 8 from both sides. Errors with algebraic manipulation were common with addition of 8 or even subtraction of 5 from both sides seen.
- Q2. Most candidates were able to gain at least 1 mark in part (a) for partially completing the tally chart. Full marks were often denied because of carelessness in transferring the given data. Other common errors included frequency columns of 3 (1×3), 14 (2×7), etc. and 3, 10 ($3+7$), 15 ($3+7+5$), etc. and $3/20$, $7/20$, etc. In part (b), a common mistake was to give an answer of 7, the frequency of the mode 2, or 3 since in the frequency column the number 3 appeared more times than any other number. Part (c) was well answered by the more able candidate. However many candidates merely added the 6 numbers to give an answer of 114. 96.5 was also a common answer to part (c), by candidates failing to apply the correct order of operations. This did however gain 1 mark. Very many candidates actually found the median, which was also 19. This gained no credit. However an answer alone of 19 with no working did gain full credit. Clearly some candidates may have been very fortunate in this respect.
- Q3. No Examiner's Report available for this question
- Q4. This question was answered very poorly. Students struggled to write down correct expressions for the number of cars Harry and Regan each sold. Common errors included writing $5x$, rather than $x + 5$, for the number of cars Harry sold and either x^2 or $x + 5 \times 2$, instead of $2x$, for the number of cars Regan sold. Some students were awarded one mark for adding three correct expressions but $4x + 5$ was usually then given as the final answer. Very few students attempted to divide their total by 3. Many students did not appear to appreciate that Regan sold twice as many cars as Dan or that the question asked for the *mean number* of cars sold.
- Q5. This was not well answered. In part (a) many candidates gave 4 as the modal number of goals scored, possibly reading the modal frequency. In part (b) many candidates added the figures from a column, this could have been the number of goals column, giving a common incorrect answer of 10 or the frequencies column giving an incorrect total of 24. When candidates realised that they should multiply the number of goals scored by the frequencies errors still occurred in the arithmetic with $0 \times 4 = 4$ and $4 \times 4 = 12$ being seen often. The pie chart was again poorly answered. Whilst some candidates could calculate the angles required, they could not draw them accurately. Too few candidates showed working out for this question.
- Q6. Many candidates had difficulty with this question. Firstly, there were those candidates who seemed clear that the limiting factor was the amount of butter. They saw that the appropriate multiplicative factor was 2.5 (or 2 and a half). However, many could not take the calculation any further, as they did not have the arithmetical skills to multiply 16 by 2 and a half. Some candidates tried to build up the amounts, such as $100 + 100 + 50$ for the butter and 6 lots of 50 for the sugar. They

again seemed to have problems with relating this to the number of biscuits Sabrina could make. Some candidates looked as if they thought that they had to make biscuits in multiples of 16, so gave the answer 32. A few candidates were able to calculate the number of biscuits they could make given for example, 300g of sugar. They then picked the maximum value (96) as their answer. On occasion a candidate would work out the maximum number of biscuits for each of the ingredients, treating it as the limiting amount and then add all of these together.

- Q7. A fairly typical response for this question was to give the answer of 11 i.e. the candidates gave the middle value of the original list rather than ordering the list first. There were also those cases where the candidates gave the mode and some even calculated the mean. Many candidates chose to use 8 of the numbers instead of 9 and lost marks because of carelessness.
- Q8. This question was answered very poorly. Students struggled to write correct expressions for Bob's height and Cath's height. Those who did write $x + 10$ and $x - 4$ often got no further. Some used $10x$ rather than $x + 10$ and it was common to see just the single expression $x + 10 - 4$ which gained no marks. Very few students attempted to divide their total by 3
- Q9. It was nice to see the occasional \pm to give a fully complete answer. Many candidates, however, interpreted $6m^2$ as $(6m)^2$ and ended up with $m = \frac{\sqrt{k}}{6}$. Some candidates were not careful enough with the placing of the square root sign so it was difficult to distinguish $m = \frac{\sqrt{k}}{6}$ from $m = \sqrt{\frac{k}{6}}$
- Q10. Most students understood the concept of median in part (a) though many did not order the data but could score one mark for selecting 7. In part (b) few students scored all 4 marks as, though they would often find the median for girls or even the mean for the boys and girls, few were able to find the range for the boys and girls. When it came to making comments whilst many students were able to comment on whether the medians were the same, few were able to make an appropriate comment in the context of the question.
- Q11. No Examiner's Report available for this question
- Q12.No Examiner's Report available for this question
- Q13. About two thirds of students gave fully correct answers to this question and there were few students who confused one measure for another. In part (a) of the question, students usually ordered the data and identified that the median was 3. Some students identified the two middle numbers correctly but then gave their answer as 3.5. Most students correctly worked out the range in part (b). The most common error seen in this part was " $5 - 2 = 3$ " Presumably this was due to a careless error rather than a lack of understanding of how to find the range. In part (c) the mean was usually found without problem though " 21×6 " and " $21 - 6$ " were seen.
- Q14. No Examiner's Report available for this question
- Q15. In part (a) most candidates could identify the greatest height, but some gave it as "8" or "6" rather than "68". In part (b) weaker candidates went for the median or the mean; but again some gave the mode as "7" rather than "37". In part (c) the mean was again common. Those trying to find the median found counting the numbers difficult, as evidenced by answers of 37 or 43.
- Q16. There is always some confusion between the various statistical measures. Candidates find it difficult to remember which one is which. This appeared to be less of a problem than in previous series, with many candidates picking up full marks. In calculating the mean candidates should always be advised to write down the full answer from their calculator. Some rounding (to 2.26) was allowed, but further than this was penalised.

In part (b) the question asked for a comparison, with the mean and range given. Most candidates

wrote something about the mean and range, but it was rarely a comparison. Frequently they copied down the figures, or worked out the difference. What was really needed was a written summative statement using descriptive terms, which is why lines were printed for the answer.

Q17. Many candidates showed poor understanding of the order of the steps required and misplaced signs or lost terms caused errors. The most common first step appeared to be showing an intention to add 4 to both sides. There were some candidates that tried dividing through by 3, however this was far less successful. Most candidates realised they had to find a square root somewhere, but frequently this was done too early in the process, before an equation of the form $p^2 =$ had been formed. A significant minority found the square root of the numerator only, but of concern are those candidates whose presentation of the answer was ambiguous: it was not clear whether the square root was intended to go over the entire fraction or not; some missed off the " p^2 " from their final answer. Full marks could not be awarded in these cases. The use of flow diagrams rarely led to any marks.

Mark Scheme

Q1.

Paper: 5MB3F_01				
Question	Working	Answer	Mark	Notes
		$h = \frac{x-8}{5}$	2	M1 for intention to either subtract 8 from both sides or divide each term by 5 as a first stage of working A1 for $h = \frac{x-8}{5}$ oe

Q2.

Question	Working	Answer	Mark	Notes
(a)		3, 7, 5, 3, 2	2	M1 for at least 1 correct frequency or 1 correct tally cell A1 all frequencies correct (with or without the tally column completed or incorrectly completed)
(b)		2	1	B1 for 2 or ft from (a)
(c)	20 + 18 + 23 + 17 + 15 + 21 114 ÷ 6	19	2	M1 for "(20 + 18 + 23 + 17 + 15 + 21)" [=114] ÷ 6 A1 cao [SC: B1 for an answer of 96.5 if M0 scored]

Q3.

Paper 1MA1: 2F				
Question	Working	Answer	Notes	
		720	P1	attempt to find the maximum biscuits for one of the ingredients e.g. $5000 \div 15 (= 33.3..)$ or $2500 \div 75 (= 33.3..)$ or $3000 \div 100 (= 30)$ or $320 \div 10 (= 32)$
			P1	for identifying butter as the limiting factor or $30 \times 24 (= 720)$ seen
			A1	

Q4.

PAPER: 5MB1F_01				
Question	Working	Answer	Mark	Notes
		$\frac{x+x+5+2x}{3}$	2	M1 for intention to add $x, x + 5, 2x$ or $4x + 5$ seen or ambiguous answer, e.g. " $4x + 5$ " ÷ 3 A1 for $\frac{x+x+5+2x}{3}$ oe

Q5.

Question		Working	Answer	Mark	Notes
(a)			3	1	B1 cao
(b)			50	2	M1 for fx calculated (could be implied by at least 2 correct)
(c)	$0 \times 4 + 1 \times 5 + 2 \times 4 + 3 \times 7 + 4 \times 4 = 50$ $360^\circ \div 24 = 15$ Sector angles: $W=150$; $D=90$; $L=120$	Angles drawn, labelled		3	A1 cao M1 for $360 \div 24$ or 15 seen or one angle correct in pie chart ($\pm 2^\circ$), ignore all labels, or one correct angle in the table A1 for any two angles correct in pie chart. Ignore labels A1 for fully correct and labelled pie chart All angles $\pm 2^\circ$

Q6.

	Working	Answer	Mark	Notes
	$250 \div 100 = 2.5$ $300 \div 50 = 6$ $600 \div 120 = 5$ $60 \div 15 = 4$	40	3	M1 for $250 \div 100$ or $300 \div 50$ or $600 \div 120$ or $60 \div 15$ M1 for $250 \div 100$ and $16 \times '2.5'$ or 2.5 oe seen and $16 \times '2.5'$ A1 cao SC M2 ($16+16+16 \div 2$) oe A1 cao SC M2 ($250 \div \frac{100}{16}$) oe A1 cao

Q7.

PAPER: IMA0 2F				
Question	Working	Answer	Mark	Notes
		13	2	M1 for ordering the 9 numbers or for indicating the middle number A1 cao

Q8.

Question	Working	Answer	Mark	Notes
		$\frac{x+10+x+x-4}{3}$	3	M1 for $x + 10$ or $x - 4$ M1 for $x + 10 + x + x - 4$ A1 for $\frac{x+10+x+x-4}{3}$ oe

Question	Working	Answer	Mark	Notes
	$m^2 = \frac{k}{6}$	$m = \sqrt{\frac{k}{6}}$	2	M1 $m^2 = \frac{k}{6}$ or $6m^2/6 = \frac{k}{6}$ or $\sqrt{6m^2} = \sqrt{k}$ or $\sqrt{6} m = \sqrt{k}$ A1 $m = \sqrt{\frac{k}{6}}$ or $m = \pm\sqrt{\frac{k}{6}}$ or $m = -\sqrt{\frac{k}{6}}$

Q10.

5MB1F/01 June 2015				
Question	Working	Answer	Mark	Notes
(a)	7 8 8 8 9 9 10 13 14	9	2	M1 Put in ascending or descending order or select middle value (7) from unordered list A1 9 cao
(b)	Girls' median is 9 Boys' mean is 9.5(55...) Girls' mean is 10 Boys' range is 7 Girls' range is 8	Comparison	4	B1 Girls' median is 9 or (boys' mean = 9.5(55...) and girls' mean = 10) Also allow comparison of minimum or maximum values B1 Girls' range = 8 and boys' range = 7 C1 Comparison of medians (ft) or means C1 Comparison of ranges (ft). At least one comparison must be in context for the award of both C marks

Q11.

Question	Working	Answer	Notes
		$t = 3(y + 2a)$	M1 adding $2a$ to both sides or multiplying each term by 3 A1 $t = 3(y + 2a)$ or $t = 3y + 6a$

Q12.

Question	Working	Answer	Notes	
(a)		10	P1	for process to find number of people that Ellie can make mousse for using the sugar available
			P1	for process to find number of people that Ellie can make mousse for using the chocolate available
			A1	for correct answer with supportive working
(b)		correct explanation	C1	for "can only make mousse for 6 people" oe

Q13.

Question	Working	Answer	Mark	Notes
(a)		3	2	M1 for evidence of ordering A1 cao
(b)		4	2	M1 for $6 - 2$ A1 cao
(c)		3.5	2	M1 for $(3 + 6 + 2 + 2 + 5 + 3) \div 6$ or $21 \div 6$ A1 cao

Q14.

Paper 1MA1: 2F				
Question	Working	Answer	Notes	
		$p = qr - sr$	M1	for multiplying all 3 terms by r or isolating p/r term
			A1	oe

Q15.

	Working	Answer	Mark	Notes
(a)		68	1	B1 cao
(b)		37	1	B1 cao
(c)		41	2	M1 for an attempt to find the middle number or circling the 1 in the diagram or writing 1 or 4 1 A1 cao

Q16.

Question	Working	Answer	Mark	Notes
(a)(i)		2.23	4	B1 cao
(ii)	$2.19+3 \times 2.23+2.26+2.28+2 \times 2.29+2.31+2.33$ $22.64 \div 10$	2.264		M1 for summing heights and dividing by 10 A1 for 2.26(4)
(iii)		0.14		B1 accept - 0.14
(b)		mean for men is greater and range for women is greater	2	B1 ft for comparison of means B1 ft for comparison of ranges

Q17.

	Working	Answer	Mark	Notes
	$3p^2 = y + 4$ $p^2 = \frac{y+4}{3}$	$p = \sqrt{\frac{y+4}{3}}$	3	M1 for clear intention to add 4 to both sides or divide all terms by 3 (with at least 3 terms) M1 for clear intention to find the square root from $p^2 =$ (expression in y) A1 for $p = \sqrt{\frac{y+4}{3}}$ oe (accept \pm a correct root)