



COUNTDOWN TO YOUR FINAL MATHS EXAM ... PART 6 (2018)

EXAMINERS REPORT & MARKSCHEME

Mark Scheme

Q1.

Question	Working	Answer	Mark	Notes
*	Girls: $8 - 2 = 6$ Boys: $6 - 1 = 5$	correct with explanation	3	M1 for girls' range = $8 - 2$ or boys' range = $6 - 1$ or comparison of largest and smallest scores A1 for girls' range = 6 and boys' range = 5 C1 (dep on M1) ft for correct interpretation from candidate's working and where the two ranges have been correctly linked with girls and boys

Q2.

Question	Working	Answer	Mark	Notes
	$10 \times \text{£}2.50 = 25.00$ $11 \times 15\text{p} = 1.65$ $7 \times 20\text{p} = 1.40$ $25 + 1.65 + 1.4$	28.05 Yes	5	B1 calculations involve all three items and all five days M1 any one of " $10 \times \text{£}2.50$ ", " $11 \times 15\text{p}$ ", " $7 \times 20\text{p}$ " A1 any one of 25.00, 1.65, 1.40 A1 for 28.05 C1 (dep M1) for comparison and correct deduction using their figures eg 28.05 so yes OR B1 calculations involve all three items and all five days M1 any one of $1 \times \text{£}2.50 + 3 \times 15\text{p} + 2 \times 20\text{p}$ or $4 \times 15\text{p}$ or $2 \times \text{£}2.50 + 2 \times 15\text{p}$ or $4 \times \text{£}2.50 + 3 \times 20\text{p}$ or $3 \times \text{£}2.50 + 2 \times 15\text{p} + 2 \times 20\text{p}$ A1 any one of 3.35, 0.60, 5.30, 10.60, 8.20 A1 for 28.05 C1 (dep M1) for comparison and correct deduction using their figures eg 28.05 so yes

Q3.

Question	Working	Answer	Mark	Notes
(a)	2×12	24	1	B1 cao
(b)	e.g. $12 + 6$	18	2	M1 for $4.5 \times 12 - 3 \times 12$ or $(4.5 - 3) \times 12$ or $12 + 6$ or 6 seen "54" – "36" oe A1 cao
(c)	$2.75 \times 12 \times 8$	2.64	3	M2 for complete method seen, " $2.75 \times 12 \times 8$ " or " $12 + 12 + 9 \times 8$ " or " $2.75 \times 8 \times 12$ " or " 33×8 " " 96 " + " 96 " + " 72 " or the digits 264 seen (M1 for 2.75×12 or $12 + 12 + 9$ or $24 + 9$ or " 33 " or 2.75×8 or 12×8 or 24×8 or 9×8 or 192 seen or 96 seen or 72 seen) A1 cao (SC M1 $(12 + 12 + 8) \times 8$ but not 32×8) Note: The method marks can also be awarded if the candidate uses 0.08

Q4.

PAPER: 5MB3H 01				
Question	Working	Answer	Mark	Notes
(a)		10.25	2	M1 for an attempt to expand the bracket or divide both sides by 4 as a first step. A1 for 10.25 oe
(b)		$t = \frac{P+3}{4}$	2	M1 for a correct first step of either adding 3 to both sides or dividing both sides by 4 A1 for $t = \frac{P+3}{4}$ oe [SC: B1 for $P + 3 \div 4$ if M0 scored]

Q5.

Question	Working	Answer	Mark	Notes
(a)		5, 1, 4, 8	2	M1 for at least 2 correct frequencies or 2 correct tallies A1 for all frequencies correct (ignore tally column)
(b)		dog	1	B1 ft from frequency column or from tally if different to frequency. Accept 8

Q6.

Question	Working	Answer	Mark	Notes
	$5 \times 3 + 15 \times 8 + 25 \times 11 + 35 \times 9 + 45 \times 9 = 1130$ $1130 \div 40$	28.25	4	M1 for finding \bar{fx} with x consistent within intervals (including the end points) allow 1 error M1 (dep) for use of all correct mid-interval values M1 (dep on first M1) for $\Sigma \bar{fx} \div 40$ or $\Sigma \bar{fx} \div \Sigma f$ A1 for 28.25 or 28 $\frac{1}{4}$

Q7.

Question	Working	Answer	Mark	Notes
(a)		32	1	B1 cao
(b)	LQ = 21 UQ king = 45	24	2	M1 for 45 or 21 or 43.5 or 19.5 or 7.75 th or 8 th or 23.25 th or 24 th (al of the above may be seen in working space or indicated on S&L) or Clear attempt to find UQ and LQ from list of values or in stem and leaf diagram A1 cao

Q8.

Paper 5MB1H 01				
Question	Working	Answer	Mark	Notes
*		Justification	4	M1 for method to find total mileage eg $55 \times 5 + 50 (= 325)$ M1 for method to find mean eg $325 \div 6$ A1 for 54.1 – 54.2 C1 (dep on at least M1) for justification comparing means. OR M1 for method to find total mileage for Andy's mean $52.5 \times 6 (= 315)$ M1 for method to find correct total mileage $55 \times 5 + 50 (= 325)$ A1 for 315 and 325 C1 (dep on at least M1) for justification comparing correct totals

Q9.

	Working	Answer	Mark	Notes
		7	3	M1 for $4 \times 6 (= 24)$ or $4 + 6 + 7 (= 17)$ M1 (dep) for "24" – "17" A1 cao

Q10.

PAPER: 1MA0_2F				
Question	Working	Answer	Mark	Notes
(a)		30	1	B1 cao
(b)		63	2	M1 for $[(4 \times 0)] + (5 \times 1) + (10 \times 2) + (7 \times 3) + (3 \times 4) + (1 \times 5)$ Or $[0] + 5 + 20 + 21 + 12 + 5$ condone one error or omission or for 67 given as total A1 cao
(c)		2.1	2	M1 for an attempt to divide the number of customers by the number of tables A1 for 2.1 or ft from (a) and (b)

Q11.

	Working	Answer	Mark	Notes
*	Ranges 50 and 46 IQR s 19 -21 and 19-21 Medians 47 and 44	Comparison of data	4	B1 Correct calculation of the median B1 Correct calculation of the ranges or the IQRs C1 for a correct comparison (ft) of medians C1 for a correct comparison of ranges or IQRs (ft) with interpretation or B1 Correct calculation of the median (47) B1 Correct calculation of the ranges or the IQRs C1 for a correct comparison of ranges or IQRs (ft) C1 for a correct comparison of medians (ft) with interpretation

Q12.

5MB1H 01 November 2015				
Question	Working	Answer	Mark	Notes
		$\frac{5x+4}{3}$	2	M1 $x + x + 4 + 3x (= 5x + 4)$ A1 for $(x + x + 4 + 3x) \div 3$ oe

Q13.

Question	Working	Answer	Mark	Notes
(a)		24	3	M1 for $4 \times 10 (= 40)$ M1 for operations – "40" then $\div 7$ in correct order or 20 A1 cao
(b)		$35e$	2	M1 for $7 \times e$ or $5 \times e$ or $7 \times 5 \times e$ oe A1 for $35e$ (ignore £ signs)

Q14.

PAPER: 5MB3F_01				
Question	Working	Answer	Mark	Notes
		4.50 1.40 3.90	3	B1 cao B1 cao B1 ft sum of stated profit figures

Q15.

Question	Working	Answer	Mark	Notes
	Median (before) = 67 Median (after) = 78 Mean (before) = 69.6 Mean (after) = 80.8(6...) Range (before) = 84 – 58 = 26 Range (after) = 102 – 65 = 37 IQR (before) = 78 – 61 = 17 IQR (after) = 91 – 69 = 22	Comparison of 1. medians / means 2. range / IQR	6	B2 for median (before) = 67 and median (after) = 78 (B1 for one correct median) OR B2 for mean (before) = 69.6 and mean (after) = 80.9 / 80.8(6..) (B1 for one correct mean) B2 for range (before) = 26 and range (after) = 37 OR B2 for IQR (before) = 17 and IQR (after) = 22 (B1 for one correct range/IQR) OR B2 for fully correct diagram/chart to compare, e.g. box plots, cumulative frequency diagrams, etc (B1 for diagram/chart with one error in presentation) C1 for median (after) > median (before) oe or ft their medians OR for mean (after) > mean (before) oe or ft their means OR C1 for range (after) > range (before) oe or ft their ranges OR for IQR (after) > IQR (before) oe or ft their IQRs C1 for comments, in context, relating to an average and to the spread of the data (dep on B3). QWC: Decisions should be justified and calculations attributable SC If no marks scored, B1 for a correct comparison (eg Heart rates are faster after walking up the stairs)

Q16.

Question	Working	Answer	Mark	Notes
		146	3	M1 for $98 \times 5 (=490)$ or $114 \times 7 (=798)$ M1 for a complete method eg “798” – “490” – 162 (=146) A1 cao

Q17.

PAPER: IMA0/2F				
Question	Working	Answer	Mark	Notes
(a)		32	2	M1 for reading off frequencies (condone one error) A1 cao
(b)		7	1	B1 cao
(c)		8	2	M1 for $10 - 2$ or $2 - 10$ or -8 A1 cao

Q18.

Question	Working	Answer	Mark	Notes
(a)	$6p - 15 = 21$ $6p = 36$ OR $2p - 5 = 7$ $2p = 12$	6	3	M1 $3 \times 2p - 3 \times 5$ or $6p - 15$ M1 "6"p - "15" + "15" = 21 + "15" A1 cao OR M1 $2p - 5 = 21 \div 3$ M1 $2p - 5 + 5 = 5 + "7"$ A1 cao
(b)	$9x - 11 = 5x + 7$ $9x - 5x = 7 + 11$ $4x = 18$	4.5	3	M1 correct method to isolate either the term in x or the numerical term e.g $9x - 5x - 11 = 5x - 5x + 7$ or $9x = 5x + 18$ A1 $4x = 18$ or $-18 = -4x$ A1 4.5 oe

Examiner's Report

Q1. This was the first 'Quality of Written Communication' question on the paper. If a candidate knew how to work out at least one range they generally scored 2 or 3 marks. Most candidates were careful to denote which range (girls' or boys') they were working out and so gained full marks. There were some candidates who used the extreme values in the table, for example calculating $6 - 3$ for the range of the girls. Others calculated the mean or the totals.

Q2. Majority of candidates gained at least 3 marks for their answers to this question. Responses were well organised and much of the working was accurate. Most candidates calculated sales for each day before adding to give the total sales. A smaller proportion of candidates calculated the sales for each item then added to give them their total. Candidates generally handled the mixture of pounds and pence with confidence. Where marks were lost it was usually due to either an occasional mistake in the arithmetic or a failure to give a clear conclusion in response to the question "Has Mark sold at least £28 of equipment this week?" Candidates who had made an arithmetical error which gave them a total less than £28 often qualified for the award of the communication mark where their final statement was supported by their working.

Q3. In part (a) majority of candidates gave the correct response of 24. Incorrect answers were varied demonstrating that either the candidate had read the wrong day or in the case of the weaker candidates did not understand the significance of the key.

In part (b) 77% of candidates gave the correct response of 18. Where incorrect responses were given most candidates failed to gain the method mark due to lack of working out shown. Common incorrect responses were 56 instead of 54 and 30 instead of 36. Where candidates did gain 1 mark it was usually for realising that half a symbol was equal to 6 text messages.

In part (c) This question was well attempted candidates achieving 2 or 3 marks. Candidates who achieved 2 marks were able to arrive at the correct number text sent on Thursday and multiply by 8, but were unable to correctly place the decimal point and gave the answer £264 or, in fewer cases, 26.4 or 0.264. Weaker candidates gained 1 mark for 33 without going on to calculate the cost or for 96 or 192 seen indicating they could at least find out the cost of a symbol's worth of text messages. The most common error, which due to lack of working out often led to 0 marks, was from incorrectly calculating $\frac{3}{4}$ of 12 as 8 and hence writing 32×8 or calculating $\frac{1}{4}$ of 12.

Q4. Although this was well answered, the most common error in part (a) was in the expansion of $4(y - 7)$; $4y - 7$ being a popular wrong expression. In part (b), many candidates made an incorrect first step which prevented any credit given. $P - 3 = 4t$ was a common error. Some chose to divide by 4 initially but failed to divide all terms by 4 and so gained no credit.

Q5. The frequency table in part (a) was completed correctly by most students. When one of the frequencies was incorrect it was often the one for dogs. Students could have checked that the sum of their frequencies was 18.

In part (b) the mode was generally well understood. Incorrect answers included 7 (the range of the frequencies) and 45 (the sum of the frequencies).

Q6. The responses to this question were very mixed. When candidates knew how to tackle the question the use of the mid-interval values was very much in evidence but there were still some who used either the upper or the lower values of the class intervals. A significant number of candidates worked out the correct answer but then felt the need to round this to 28 on the answer line or to give the answer as the class interval itself. Those who had shown 28.25 in the working

were not penalised for doing this. Some candidates realised that 'fx' could be involved and did the appropriate calculations but then decided not to use these results, choosing instead to divide the total of the frequencies by the number of class intervals (a very common incorrect method) and gaining no marks.

Q7. part (a) was well answered although some candidates failed to interpret the diagram correctly and gave 2 rather than 32 as the median.

In part (b) 49 was a common incorrect answer from those candidates who worked out the range rather than, as requested, the interquartile range. Others attempted to work out the interquartile range by halving the range. Some candidates worked out that the lower and upper quartiles would come from the 7.75th and 23.25th (or 8th and 24th) values but then went on to subtract 7.75 from 23.25 rather than use the values of the variable associated with them.

Q8. Working with the mean is not well understood, as exemplified by the many confused solutions given to this question. Some attempted to make a comparison without undertaking any calculations, but marks were only given for a conclusion if such a calculation was attempted. Few attempted to work backwards using the given information in the statement, though this was a valid method. Most who arrived at a re-calculated mean then went on to make a sound conclusion.

Q9. This question was generally answered well. A large number of candidates opted for a trial and error approach and many were able to reach the correct final answer. It was, however, quite common to see 6 (the mean) given as the final answer after correct working had been shown. Some candidates added the three numbers given but did not know how to proceed with some dividing the total by 3. Those who gained no marks generally just wrote a number, eg 5, that looked like it fitted the pattern of the given cards.

Q10. This question was poorly answered with the exception of part (a). Many candidates in part (b) just added up the 0, 1, 2, 3, 4 and 5 to give the answer of 15 and then wrote down the answer of 2.5 in part (c) obviously making the classic mistake of dividing by the number of rows in the table.

Q11. For a question such as this, candidates have to decide which (simple) statistics they can and are able to calculate in order for a comparison to be made. Some were unaware of this and worked out the mean.

Many other candidates worked out the median and the values of the lower quartile and upper quartile as these were given for the distribution of heights of the unfertilised plants. This gained one mark (for the median).

To get further marks, candidates had to work out a measure of spread and then comment on the relationship between the medians and between the interquartile ranges (IQRs) or the ranges. This could be as simple as 'The median of the heights of the fertilised plants is greater than the heights of the unfertilised plants'.

For full marks, it was expected that there would be some simple interpretation, for example, 'Since the median of the fertilised plants is bigger than the median of the unfertilised plants, on average the fertilised plants grew taller'. This sort of response was not frequently seen.

It was very important in this question that the results of calculations were identified, for example, the median had to be stated as 47 (cm). It was not sufficient simply to circle 47 in the list of heights.

Q12. Only a disappointingly low proportion of students were able to identify how to combine the three algebraic expressions given. About a half of students wrote down an expression for the sum of the three ages and about two thirds of these students then divided this by 3 to score both marks. Responses to this question revealed a widespread lack of ability to work with simple linear algebraic expressions set in a problem with some context.

Q13. Part (a) was generally well answered with many students who did not get the full 3 marks still picking up 2 for showing a complete correct method or getting an answer of 20, the hours worked during the week. Students would be well advised to reread the actual question to make sure that their answer matches it – in this instance they would remind themselves to add the 4 hours back on to the 20 calculated for the rest of the week, Monday to Friday. Many of the students who failed to score any marks had not realised that they needed to subtract the £40 for Saturday first and instead proceeded to attempt to divide £180 by 7. This was one of several questions where a lack of skill with division hampered accuracy. Those that used cumulative addition as a method of division were not as successful as others who worked from knowledge of $7 \times 2 = 14$ to deduce that $140 \div 7 = 20$

Students had far less success with part (b) with only a minority offering the correct simplified expression $35e$. Some made a little progress and offered $7e$ but many others clearly did not understand the meaning of the word expression. Some attempted numerical work, often using information from part (a) or gave an equation.

Q14. This was a well answered question. Some weaker students failed to recognise that the Doll required a sale price and instead gave the answer as £1.50.

Q15. This question was worth 6 marks so it was somewhat surprising to see that some candidates limited themselves to a brief comment stating that heart rates were higher after people had walked up the stairs. Examiners were able to give this little credit without any supportive evidence. At the other extreme a significant number of candidates worked out the mode, median, mean, range and interquartile range for "before" and "after". Some then made an attempt to interpret their findings whilst others judged that they had completed the question once the calculations were done. What was required, of course, was the calculation and comparison of an appropriate average (i.e. the median or mean) for "before" and "after", the calculation and comparison of an appropriate measure of spread (i.e. the range or interquartile range) and then some interpretation in the context of the question. Most candidates were able to score marks for the calculations, but far fewer were able to deduce that the hearts rates had risen (due to the rise in the average considered) and that

they were more varied after the 15 people had walked up the stairs (due to the rise in the measure of spread considered). Common errors included giving "60" as the median and "81" as the highest heart rate for the people before they walked up the stairs. This seems to have arisen because candidates took the leaf furthest to the right as having the highest value.

Q16. Many students scored full marks on this question, others scored M1 for either 98×5 or 114×7 .

The most common error seen was to just multiply any two out of 98, 114 and 162 with no thought to what these might mean. This showed a lack of comprehension of the question asked.

Q17. In part (a) there were many correct answers. Adding the marks rather than the frequencies appeared to be a common error, though there were also those who omitted one of the frequencies, or perhaps read one off incorrectly.

In part (b) many wrote down the correct answer, though there were some who clearly did not know the meaning of the term "mode". Part (c) was not well answered. Many calculated $6-1$ (giving an answer of 5), or even $10-1$ rather than $10-2$.

Q18. Both parts were generally well answered. Candidates had been well drilled in how to solve equations.

In part (a), a few could not expand the brackets correctly but often were able to solve their resulting equation.

In part (b), most students could carry out balancing operations although sometimes with a lack of care.