

# **COUNTDOWN TO YOUR FINAL MATHS EXAM ... PART 3 (2017)**

## **EXAMINERS REPORT & MARKSCHEME**

## **Examiner's Report**

**Q1.** No Examiner's Report available for this question

**Q2.** No Examiner's Report available for this question

**Q3.** No Examiner's Report available for this question

**Q4.** It is encouraging to report that over half of all candidates gave fully correct responses to this question. It was common to see the correct method for each part clearly written in the working space. Where candidates had identified a correct method, some made careless errors.

For example the answer "5.5" was seen often for part (a) and in part (b) candidates often totalled the numbers correctly only to divide their total by 8 or 10 instead of by 9. In working out the mean candidates often omitted brackets and wrote " $4 + 8 + 5 + 9 + 10 + 5 + 6 + 3 + 4 \div 9$ " instead of the correct " $(4 + 8 + 5 + 9 + 10 + 5 + 6 + 3 + 4) \div 9$ ". When trying to find the median many candidates forgot to order the list before selecting the "middle number".

A significant minority of candidates were confused between the different statistical measures and it was not uncommon to see the mean worked out for part (a) and the median for part (b).

The range also appeared in some candidates' responses to either part (a) or Part (b).

**Q5.** 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.

**Q6.** 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.

**Q7.** Most students gained full marks for correct tallies, though some miscounted and gave 4,8,7,3 as their frequencies; this error was not penalised later in the question.

A variety of diagrams and graphs attracted marks, the most common a simple bar chart. The most common errors were missing labels off axes, and incorrectly plotted numbers. Overall presentation was poor, with many students failing to use a ruler.

**Q8.** 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.

**Q9.** Some candidates got confused between the various statistical measures in this question and correct calculations were often seen in the wrong places.

Most candidates were able to order the given data in part (i) and use the middle values to work out the median. Common incorrect answers seen were 3, 4 (both the middle terms) and 3, 5 (both the middle terms of the unordered data).

In part (ii) most candidates were able to work out the range of the numbers. A small number of candidates gave their final answer as 2, 6.

Part (iii) of this question was done quite well but a significant number of candidates did not show any working. When working was present it frequently lacked a final division by 10.

**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.** Students were generally able to find the mode correctly in part (a) although a few gave the highest frequency of 4 instead. There were occasional responses giving the mean or median values.

Part (b) was well answered by students with many scoring full marks. Where marks were lost it was as a result of merely giving the total of 18 rather than the mean, division by 9 instead of 10 and occasionally working out the median instead of the mean. Students need to be aware that a data value of 0, whilst not contributing to the total goals, still needed to be included in a total frequency of 10 rather than 9 games. The correct final answer of 1.8 was sometimes rounded to 2, presumably through a need to present a whole number of goals as the mean. This subsequent working was ignored for the award of full marks in part (a) but the student had to use the correct 1.8 in their comparison to secure full marks in part (b).

Most students tackled part (b) by carrying out a mean calculation for all 12 games and they generally reached the correct mean of 2 goals and gave a correct conclusion and explanation for this starred question testing Quality of Written Communication. Calculation errors included division by 10 or 11 rather than 12. Some missed a few crucial words in the question and answered as if the question had simply asked if the mean would be **greater**.

**Q12.** No Examiner's Report available for this question

**Q13.** No Examiner's Report available for this question

**Q14.** No Examiner's Report available for this question

**Q15.** One mark was often awarded for  $35 \times 10 (=350)$ . Some candidates went on to work out  $33 \times 11$  and to then find the difference between their two answers. Many failed to gain full marks because they made arithmetic errors. Errors in the evaluation of  $33 \times 11$  and in the straightforward subtraction were very common. Candidates must be encouraged to check their answers, as working such as  $33 \times 11 = 330$  and  $363 - 350 = 10$  went unnoticed. Some candidates worked out both  $35 \times 10$  and  $33 \times 11$  but got

$$\begin{array}{r} 33 \\ \times 11 \\ \hline \end{array} \quad \begin{array}{r} 35 \\ \times 10 \\ \hline \end{array}$$

no further. Many candidates worked out  $\frac{33}{11} = 3$  and  $\frac{35}{10} = 3.5$  which lead nowhere and some subtracted 33 from 35 and gave 2 as the answer.

**Q16.** 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.

**Q17.** No Examiner's Report available for this question

**Q18.** Part (a) was generally well done although in some cases the answer was not fully simplified. Part (b) was also well done although some candidates on obtaining an answer of 12 went on to multiply this number by 28 to get (£) 336

Part (c) was mainly done by rounding 19.89 to 20 and 201.71 to 200 eventually giving a final answer of 4000. Alternatives were to round to 202 or 201 giving answers of 4040 and 4020 respectively, both of which were accepted for both marks. Candidates who attempted to work out the accurate calculation were given no marks.

**Q19.** Part (a) was answered quite poorly. Despite having access to a calculator, many students were unable to write  $\frac{1}{8}$  as a percentage. Some converted it to 0.125 and gave that as the answer. A wide variety of incorrect answers were seen including 80, 8 and 0.8.

Part (b) was generally answered quite well with the most common method seen being  $600 \div 6 \times 5$ . Students who converted  $\frac{5}{6}$  into a decimal before multiplying by 600 often truncated the decimal and gave an answer such as 498, thus losing the accuracy mark. Those who gave an answer of 498 with no working shown could not be awarded a method mark. A common error was to use  $\div 5$  and  $\times 6$ .

## Mark Scheme

Q1.

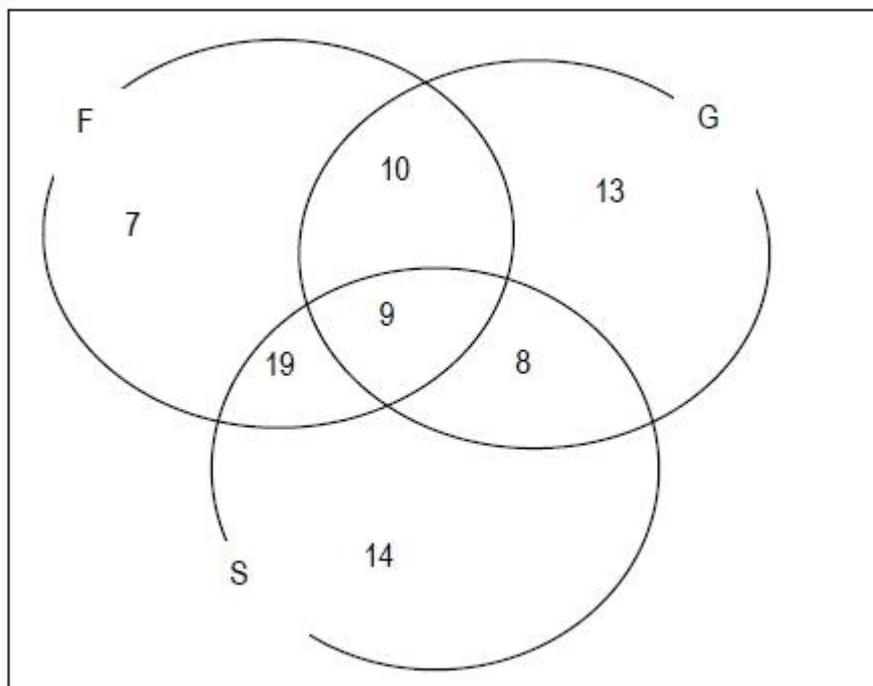
Question	Working	Answer	Mark type	AO	Notes		
(a)		Comparisons	C	2.3a	C1 for a correct interpretation of diagram, e.g. correct median, LQ or UQ		
						F	M
	Lv		75	76		C	2.3b
	Lq		80	83			
	Median		85	92			
	Uq		96	98		C	2.3b
	Hv		99	107			
	Range		24	31			
					C1 for a correct comparison of a measure of central tendency (must be in context of the data)		
(b)		Correct Venn diagram	P	2.3a	P1 for two overlapping circles with 5 in the overlap		
			P	2.3a	P1 for 8 in 'comedy' or 11 in 'science fiction'		
			C	2.3b	C1 for a fully correct Venn diagram with labels		

Q2.

Question	Working	Answer	Notes
		$\frac{3}{40}$	M1 $\frac{75}{1000}$ oe  A1

**Q3.**

Question	Working	Answer	Mark	AO	Notes
(a)	Venn diagram	Correct diagram (See diagram at end)	P  P  C	2.3a  2.3a  2.3b	P1 to begin to interpret given information, e.g. 3 overlapping labelled ovals with central region correct  P1 to extend interpretation of given information, e.g. 3 overlapping labelled ovals with at least 5 regions correct  C1 for correct process to communicate given information, e.g. 3 overlapping labelled ovals with all regions correct, including outside
(b)		$\frac{23}{80}$	B	1.3a	B1 ft diagram
(c)		$\frac{19}{40}$	M  A	1.3a  1.3a	M1 for probability with denominator 40  A1 $\frac{19}{40}$ oe



**Q4.**

Question	Working	Answer	Mark	Notes
(a)	3 4 4 5 5 6 8 9 10	5	2	M1 for ordering the 9 numbers A1 cao
(b)	$(4 + 8 + 5 + 9 + 10 + 5 + 6 + 3 + 4) \div 9$ $54 \div 9$	6	2	M1 for $(4 + 8 + 5 + 9 + 10 + 5 + 6 + 3 + 4) \div 9$ or $54 \div 9$ A1 cao

**Q5.**

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

**Q6.**

Question	Working	Answer	Mark	Notes
*	Ranges 50 and 46  IQR s 19 -21 and 19-21  Medians 47 and <b>44</b>	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

**Q7.**

Paper_5MB1F_01				
Question	Working	Answer	Mark	Notes
(a)		Correct frequencies: 4,9,6,3	2	B2 for all frequencies correct (B1 for 2 tallies or 2 frequencies correct)
(b)		Swimming or 9	1	B1 ft from frequencies or tallies in (a) or diagram in (c)
(c)		Diagram or chart	3	B1 for labelling horizontal axis with activities B1 for linear scale labelled frequency oe B1 for accurately representing the data ft from their frequencies or tallies in (a)

Q8.

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

Q9.

	Working	Answer	Mark	Notes
(i)	2 2 3 3 3 4 4 5 5 6 ↑	3.5	6	M1 for ordering the data condone one extra or one omission A1 for 3.5 or $3\frac{1}{2}$
(ii)		4		M1 for $6 - 2$ or $2 - 6$ A1 cao
(iii)		3.7		M1 for $(2+2+3+3+3+4+4+5+5+6) \div 10$ condone missing brackets or $37 \div 10$ A1 for 3.7 or $3\frac{7}{10}$  [SC B1 for 31.6 or 33.4]

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.**

PAPER: IMA0_2F				
Question	Working	Answer	Mark	Notes
(a)		1	1	B1 cao
(b)		1.8	2	M1 for adding all 10 scores <b>and</b> dividing by 10 eg $18 \div 10$ A1 cao
*(c)		Greater and explanation	2	M1 (ft from (b)) adding all 12 scores and dividing by 12 or for comparing 4 and 2 with '1.8' or comparing $4 + 2$ with $2 \times '1.8'$ C1 (ft from (b)) for correct conclusion and correct explanation NB: if M1 A1 awarded in (b) comparison must be with 1.8

**Q12.**

Question	Working	Answer	Notes
		more than	C1 Makes reference to different numbers of girls and boys C1 Completes reasoning eg there are more (boys) with 80% than (girls) with 70% or correct mean $(700+1200) \div 25 = 76$

**Q13.**

Paper 1MA1: 1H			
Question	Working	Answer	Notes
		'Yes' with correct	P1 begins process of working with mean eg $35 \times 10 (=350)$ or $33 \times 11 (=363)$ or $10 \times (35-33) (=20)$ or $11 \times (35-33) (=22)$
		working	P1 (dep) finding the difference eg "363"-"350", or $33 - "20"$ or $35 - "22"$ C1 'Yes' with 13 from correct working

**Q14.**

Paper 1MA1: 2F			
Question	Working	Answer	Notes
(i)			C1 for correct criticism of use of mean, eg. "there is no dress size of 15.3"
(ii)			C1 Mode (=14) is most useful since it shows the most popular size

**Q15.**

PAPER: 1MA0 1H				
Question	Working	Answer	Mark	Notes
	$35 \times 10 = 350$ $33 \times 11 = 363$ $363 - 350 = 13$  OR  $10 \times (35 - 33) = 20$ $33 - 20 = 13$	13	3	M1 $35 \times 10 (= 350)$ or $33 \times 11 (= 363)$ M1 (dep) finding the difference in their totals e.g. '363' - '350' A1 cao  OR  M1 $10 \times (35 - 33) (=20)$ or $11 \times (35 - 33) (=22)$ M1 (dep) $33 - '20'$ or $35 - '22'$ A1 cao

**Q16.**

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

**Q17.**

Paper 1MA1: 1F			
Question	Working	Answer	Notes
(a)		$\frac{17}{35}$	M1 for common denominators with at least one numerator correct  A1
(b)		$\frac{20}{9}$	M1 for $\frac{5}{3} \times \frac{4}{3}$ or $\frac{20}{12} \div \frac{9}{12}$  A1

**Q18.**

5MB2H/01 June 2015				
Question	Working	Answer	Mark	Notes
(a)		$5\frac{1}{4}$	1	B1 for $5\frac{1}{4}$ oe
(b)		12	2	M1 for $(28 \div 7) \times 3$ oe A1 cao
(c)		4000	2	M1 for 20 or 200 A1 for 4000 - 4040

**Q19.**

PAPER: 1MA0 2F				
Question	Working	Answer	Mark	Notes
(a)		12.5	1	B1 cao
(b)		500	2	M1 for a complete method to find $\frac{5}{6}$ of 600 or $600 \div 6$ (= 100) A1 cao