

COUNTDOWN TO YOUR FINAL MATHS EXAM ... PART 1 (2017)

EXAMINERS REPORT & MARKSCHEME

Examiner's Report

Q1. This question proved to be relatively straightforward for those students who realised that a table could be used to record the information given and work out what was necessary. This was the case for the majority of students entered at this tier. Attempts which did not use a table were less frequently successful and often could only be awarded 1 mark for calculating either the number of females (108) or the total number of economy tickets (96).

Q2. Many correct answers, which were more likely to be successful if a two-way table was used. There were many arithmetic errors, most surprisingly $22-15=17$ instead of 7. There was also a clear misunderstanding seen, where some just tried to add up all the numbers given and subtract that answer from 100. Where students found 2 values missing they tried dividing the missing amount by 2, and then rounding up or down to get a value. A few students got a completely correct two-way table, but then were careless in reading the question and gave a final answer that was not the one requested.

Q3. This question was well attempted by all, with most gaining at least part marks. A large majority of candidates managed to identify three numbers that totalled 20, although some failed to realise that these had to come from the given list. A few misunderstood the question and instead found three pairs. However, even if the pairs they had selected contained no more than one incorrect prime, they were still awarded the first method mark.

Additionally a lot of candidates were able to correctly identify two primes as part of their answer, but a large number thought that '1' is a prime number, suggesting that this topic needs further reinforcement.

A number of candidates correctly identified three primes that did not total 20. For those who correctly identified three primes that did total 20, 2, 7, 11 was the most popular choice.

Results Plus: Examiner Tip

Candidates should be encouraged to reread the question to ensure that their solution satisfies all criteria.

Q4. Not all students can divide a quantity by a given ratio. The ability to do so enabled them to make a good start on this question since numbers of boys or girls was needed to move to a second stage. However, as long as the student stated some figures for boys or girls then credit could be given for some subsequent working. It was disappointing to find some students unable to find $\frac{1}{5}$ of an amount. It was of course important in this 5 mark question for working to be shown in order for credit to be given. Even though many failed to get to the final answer, many method marks were given where examiners could see the evidence of appropriate working.

Q5. There were some accurate descriptions in part (a). Although "positive correlation" was accepted, most preferred to give the relationship in words, though not all of these gave a description of the dynamic relationship between the two variables.

Part (b) was also well answered, though a significant minority lost the marks when they used the line for sandy soil rather than clay soil.

In part (c) candidates needed to work out the gradient of the line for sandy soil. They did so in a variety of ways, the most prevalent to take two readings and divide to find the increase over one year. Some candidates thought they could do this by taking one reading and dividing by the time, which would have worked but the fact that the line did not start at the origin. Again some candidates lost the marks by using the wrong line. In part (d) nearly all candidates gained some credit for their comparative statements, but the best answers provided some additional evidence for their comparisons, usually quoting the rates of increase, or directly comparing them, for example finding one was double the other. These quality statements gained the full 2 marks.

Q6. No Examiner's Report available for this question

Q7. No Examiner's Report available for this question

Q8. No Examiner's Report available for this question

Q9. No Examiner's Report available for this question

Q10. No Examiner's Report available for this question

Q11. Most students approached this question by adding 9 minutes many times to 6.45 and then 12 minutes on to 6.45. There were many arithmetic errors found when using this approach. Those that were able to do this accurately tended to get the correct answer of 7.21 am. Very few students approached this by trying to find the LCM of 9 and 12.

Q12. Almost all candidates attempted this question and almost all of those who did achieved at least one mark. This was generally for multiplying their number of boxes and packs by the correct price and totalling the cost. However, too many candidates were unable to find the first common multiple beyond 60, possibly as a result of not reading the question carefully. Those candidates who listed multiples and then used 96 or 120 rather than 72 were able to access some of the marks. Methods were sometimes confused, but examiners were able to credit sound working where this was shown. Again this highlights the importance of showing working.

Curiously, some candidates inferred from the word "least" that the question involved finding lower bounds. Where there was correct method shown again some lost valuable marks due to incorrect processing – seemingly not having access to a calculator. Most students however did achieve the final method mark. The correct answer on the answer line was often left as £25.8 without the zero which although wasn't penalised here is not good practice when dealing with money notation.

Q13. This question acted as a good discriminator for the more able students who took this paper. The best students worked accurately and reached a fully correct solution, usually by listing multiples of 24 and multiples of 36 until they reached the first common multiple of 24 and 36 higher than 250, ie 288. Unfortunately, many students' working was blighted by poor accuracy. It was common, however, for examiners to be able to award at least 2 marks for a largely accurate attempt to write down multiples of 24 and multiples of 36.

Some students did not take into account that their solution must include making sure that there were enough book marks and dust covers for 250 books, so produced solution such as 3 boxes of book marks and 2 packs of dust covers.

Q14. No Examiner's Report available for this question

Q15. Most candidates used the factor tree method in their responses to this question. Though candidates appeared to understand what they needed to do, regrettably many of their attempts were spoiled by their inability to find correct pairs of factors, that is, they were let down by weak arithmetic. Candidates who completed the factor tree diagram successfully sometimes listed the prime factors but did not express their answer as a product so could not be awarded the mark assigned for a fully correct answer. "1" was sometimes included as a prime factor.

Q16. No Examiner's Report available for this question

Q17. No Examiner's Report available for this question

Q18. This question was only correctly answered by about half the candidates. There was confusion on two fronts, one was the different factors of 40 where candidates often gave two the same and the other was multiples of 9 where 3 was often seen as one of the three numbers. Answers such as 24, 26, 28 failed to score through lack of working shown. Many also chose three numbers totalling 20 or 30, not recognising they were not included in the range.

Q19. Candidates generally showed a good understanding in their answers to this question.

Most candidates changed each number into ordinary form before putting them in order. The number of zeros involved inevitably led to many careless errors particularly with the numbers 30×10^{-6} , -2.5×10^{-4} and 0.0052×10^6 . Nevertheless, nearly three-quarters of candidates were awarded at least two of the three marks available. Just under a quarter of candidates scored full marks. Candidates not awarded any marks usually showed no intermediate working.

Some candidates failed to realise that the one negative number must be the smallest of the five numbers listed.

Q20. Many students could change between standard form and ordinary numbers to score the marks

available in parts (a) and (b). The most frequently seen incorrect responses to part (a) included 45×10^4 and 45^4 .

Q21. No Examiner's Report available for this question

Q22. This question was poorly answered. Those who had some idea of what to do generally picked up a mark for dividing the real distance by the distance between the models. However, few realised that they also had to deal with inconsistent units having failed to notice that one distance was in m and the other in km and made no attempt to convert between m and km. Some candidates who did spot that units had to be consistent were then unable to change metres into kilometres successfully.

Q23. Most candidates made a good attempt at this question. Their approach was usually to find the total thickness of the 500 sheets of paper and compare this with the depth of the paper tray. This was often done successfully with a clear statement made in conclusion. A common error was to write 9×10^{-3} either as 0.0009 or as 0.09. Candidates who had previously shown the product $500 \times 9 \times 10^{-3}$ had already gained some credit and could score a further communication mark but candidates who had just written 0.0009 or 0.09 could not access these marks. Few candidates used the alternative approach of working out the thickness of each sheet of paper if exactly 500 could be stored in the tray and then comparing their answer with the thickness of a sheet of paper as stated in the question.

Mark Scheme

Q1.

5MB1H 01 November 2015							
Question	Working				Answer	Mark	Notes
					28	4	<p>M1 for total female students $200 - 92$ or 108 seen; or for total Economy passengers $200 - 44 - 60$ or 96 seen. M1 for total male passengers in Economy “96”-62 or 34 seen; or for total female Premium “108” – $62 - (44 - 30)$ or 32 seen M1 for $92 - 30 - “34”$ or for $60 - “32”$ A1 cao</p> <p>OR</p> <p>Answers may appear in a two-way table with no other method seen B1 for Female total 108 or Total Economy 96 M1 for “96” – 62 or 34 seen in Male Economy; or “108” – $62 - (44 - 30)$ or 32 seen in Female Premium M1 for $92 - 30 - “34”$ or for $60 - “32”$ A1 cao</p>
		Bus	Pre	Ec	Tot		
	M	(30)	28	34	(92)		
	F	14	32	(62)	108		
	Total	(44)	(60)	96	(200)		
	<p>() value given</p>						

Q2.

Question	Working	Answer	Mark	Notes
	<p>2p 1p ½ p Tot</p> <p>Sat 7 16 (31) 54</p> <p>Sun (15) 14 17 (46)</p> <p>Tot (22)(30) 48 (100)</p>	14	4	<p>M1 for total Sat bottles $100 - 46 (=54)$ or for total ½ pint bottles $100 - 22 - 30 (=48)$ or (total 2 pint bottles on Sat) $22 - 15 (=7)$ M1 for total Sun bottles of ½ pint “48” – $31 (=17)$ or for total Sat bottles of 1 pint: “54” – $31 - (22 - 15) (=16)$ M1 for $46 - 15 - “17”$ or for $30 - “16”$ A1 cao NB: any of the above figures could be shown in a 2-way table</p>

Q3.

Question	Working	Answer	Mark	Notes
		3 primes that total 20	3	<p>M1 for identifying at least 2 different prime numbers from the list, could indicate on the list (not more than one incorrect) M1 for any 3 numbers from the list that total 20 A1 for 2, 7, 11 or 2, 5, 13 or both (in any order)</p>

Q4.

Paper 5MB1H_01				
Question	Working	Answer	Mark	Notes
		28	5	M1 for method to find $\frac{1}{5}$ of children eg $60 \div 5 (=12)$ M1 for method to find number of boys or girls eg " $12" \times 2 (=24)$ or " $12" \times 3 (=36)$ M1 for method to find total number going in the morning eg $\frac{3}{4} \times 60 (=45)$ M1 for complete method to find number of girls going in the morning eg $45 - (24 - 7)$ A1 cao

Q5.

5MB1H/01 June 2015				
Question	Working	Answer	Mark	Notes
(a)		Description	1	B1 description eg Taller trees are older. Accept positive correlation.
(b)		20	1	B1 19 – 21
(c)		2	2	M1 for evidence of taking readings at two points from Sandy line, or increase excluding start eg $24 \div 10, 14 \div 5$ A1 for answer 1.8 to 2.2
(d)		Comparison	2	B2 for a complete explanation e.g. Trees grow at approximately <u>twice the rate</u> on sandy soil (B1 for a partial explanation e.g. Trees grow faster on sandy soil)

Q6.

Paper 1MA1: 3H				
Question	Working	Answer	Mark	Notes
(a)		(4,10)		B1 cao
(b)(i)		Line drawn		B1 Straight line drawn passing between (2,20) and (2,30) AND (13,86) and (13,94)
(b)(ii)		Positive		C1 positive
(c)		Value between 60 and 70		C1 a correct value given
(d)		Statement		C1 for referring to the danger of extrapolation outside the given range or for a given point Eg line of best fit may not continue or full marks are hard to achieve no matter how much revision is done

Q7.

Question	Working	Answer	Notes
		8, 12, 20 or 4, 8, 28 or 4, 12, 24 or 4, 16, 20	P1 Adds 3 different multiples of 4 A1

Q8.

Paper 1MA1:3F			
Question	Working	Answer	Notes
		Yes with evidence	C1 for writing down at least two squares numbers P1 for adding square numbers A1 cao with supporting evidence

Q9.

Paper 1MA1: 1F			
Question	Working	Answer	Notes
(a)		42, 58 39, 3, 53, 5	C1 starts to interpret information eg. one correct frequency C1 continue to interpret information C1 communicates all information correctly
(b)		$\frac{5}{58}$	M1 ft for $\frac{a}{58}$ with $a < 58$ or $\frac{5}{b}$ with $b > 5$ A1 ft from (a)

Q10.

Paper 1MA1: 2F			
Question	Working	Answer	Notes
(a)		eg. $2 \times 5 = 10$	B1 example given
(b)		explanation	P1 two prime numbers identified C1 conclusion which also shows at least one calculation with prime numbers or identifies one of the prime numbers as 2.

Q11.

5MB2F 01 November 2015				
Question	Working	Answer	Mark	Notes
		7.21 (am)	3	<p>M1 for listing multiples 9,18,27,36 and 12,24,36 (condone 1 arithmetic error) or method to find LCM</p> <p>M1 for identifying 36 as LCM</p> <p>A1 cao</p> <p>OR</p> <p>M1 for listing times 6.54, 7.03, 7.12, 7.21 or for listing times 6.57, 7.09, 7.21 (condone one arithmetic error)</p> <p>M1 for listing times 6.54, 7.03, 7.12, 7.21 and 6.57, 7.09, 7.21 (condone one arithmetic error)</p> <p>A1 cao</p>

Q12.

PAPER: IMA0_2H				
Question	Working	Answer	Mark	Notes
	12, 24, 36, 48, 60, 72, 8, 16, 24, 32, 40, 48, 56, 64, 72,...	25.80	5	<p>M1 for listing at least 3 multiples of each of 12 and 8 or 24 in two lists of multiples or from factor trees</p> <p>M1 (dep) for attempt to find a common multiple of 12 and 8 above 60 (=72)</p> <p>M1 (dep M2) for method to find the number of boxes and the number of packs $72 \div 12 (=6)$ and $72 \div 8 (=9)$</p> <p>M1 for finding the total cost by multiplying numbers by cost and adding eg "6" \times 2.50 + "9" \times 1.20</p> <p>A1 for 25.8(0)</p>

Q13.

Question	Working	Answer	Mark	Notes
	24, 48, 72, 96, 120, 144, 168, 192, 216, 240, 264, 288 36, 72, 108, 144, 180, 216, 252, 288	12 boxes of book marks 8 packs of dust covers	4	<p>M1 attempts multiples of either 24 or 36 (at least 3 but condone errors if intention is clear)</p> <p>M1 attempts multiples of both 24 and 36 (at least 3 but condone errors if intention is clear)</p> <p>M1 (dep on M2) for a division of 250 or 288 by 24 or 36, or counts up "multiples" (implied if answers reversed)</p> <p>A1 for 12 boxes of book marks, 8 packs of dust covers. Accept (15b, 10p), (18b, 12p) etc</p> <p>(SCB1 for (11b, 7p))</p>

Q14.

Question	Working	Answer	Mark type	AO	Notes
	$7 + 28 + 22 = 57$	11, 44 and 38	P	3.1b	P1 for a correct process to develop algebraic expressions for each number and set up an inequality, e.g. $x + 4x + 4x - 6 > 57$ or for a correct trial with a prime number
			P	3.1b	P1 for a correct process to solve the inequality, e.g. $x > (57 + 6) \div 9 (= 7)$ or for a correct trial with the prime number as 7 resulting in a sum of 57
			A	1.3b	A1 cao

Q15.

	Working	Answer	Mark	Notes
	5 525 5 105 3 21 7	$3 \times 5 \times 5 \times 7$	3	M1 for continual prime factorisation (at least first 2 steps correct) or first two stages of a factor tree correct M1 for fully correct factor tree or list 3, 5, 5, 7 A1 $3 \times 5 \times 5 \times 7$ or $3 \times 5^2 \times 7$

Q16

Question	Working	Answer	Mark	AO	Notes
(i)		$2^3 \times 3 \times 5$	B	1.3a	B1 cao
(ii)		$2^4 \times 3^3 \times 5^2$	B	1.3a	B1 cao

Q17.

Question	Working	Answer	Notes
		1,3,9 or 2,6,9 or 2,3,6 or 2,3,18 or 2,9,18	M1 3 factors of 18 or 3 numbers with prime total A1 eg 2, 3, 6

Q18.

PAPER: 1MA0_2F					
Question	Working	Answer	Mark	Notes	
		eg. 18, 4, 5	3	M1 for two different factors of 40 M1 for 3 numbers where the sum lies between 20 and 30 AND (where one is 9 or 18 or two are different factors of 40 A1	

Q19.

	Working	Answer	Mark	Notes
	4.2×10^5 1.3×10^5 3.0×10^{-5} $- 2.5 \times 10^{-4}$ 5.2×10^3 OR 420000 130000 0.00003 $- 0.00025$ 5200	$- 2.5 \times 10^{-4}$ 30×10^{-6} 0.0052×10^6 13×10^4 4.2×10^5	3	M1 for intention to reduce numbers to standard form A1 at least two numbers correctly changed into standard form A1 correct order (any form) OR M1 for intention to reduce numbers to ordinary form A1 at least two numbers correctly changed into ordinary form A1 correct order (any form) (SC B2 for correct ordering largest to smallest)

Q20.

PAPER: 5MB3H 01				
Question	Working	Answer	Mark	Notes
(a)		4.5×10^5	1	B1 cao
(b)		0.00032	1	B1 cao

Q21.

Paper 1MA1: 1H			
Question	Working	Answer	Notes
		2.7×10^4	M1 For evidence of a correct method eg. $27 \times 10^{-4+7}$ A1

Q22.

Question	Working	Answer	Mark	Notes
	16 metres: 8×10^8 km. $16: 8 \times 10^8 \times 1000$ $16: 8 \times 10^{11}$ $1: 5 \times 10^{10}$ OR 2 m to 10^8 km 2m to 100 000 000 000m 1m to 50 000 000 000m	$1: 5 \times 10^{10}$	3	M1 (indep) correct method to convert to consistent units M1 ' 8×10^8 ' (units may not be '16' consistent) or 5×10^{10} oe or 5×10^7 oe A1 $1: 5 \times 10^{10}$ or 1: 50 000 000 000 OR M1 (indep) correct method to convert to consistent units M1 ' $16/8$ ' to ' 10^8 ' A1 $1: 5 \times 10^{10}$ or 1: 50 000 000 000

Q23.

		Working	Answer	Mark	Notes
*	QWC		No + explanation	3	<p>M1 for $500 \times 9 \times 10^{-3}$ oe A1 for 4.5 C1 (dep M1) for correct decision based on comparison of their paper height with 4</p> <p>OR</p> <p>M1 for $4 \div 500$ oe A1 for 0.008 C1 (dep M1) for correct decision based on comparison of their paper thickness with 0.009</p> <p>OR</p> <p>M1 for $4 \div (9 \times 10^{-3})$ oe A1 for 444(.4...) C1 (dep M1) for correct decision based on comparison of their number of sheets of paper with 500</p>