Countdown to your final Maths exam ... part 7 (2018)

Examiners Report & Markscheme

Mark Scheme

Q1.

PAPER: 1MA0_2F					
Question		Working	Answer	Mark	Notes
	(a)		14 cm or 0.14 m	3	M1 for $3 \times 32 + 2 \times 45$ (=186) oe M1 (indep) for subtraction of "wood needed" from 2 m using consistent units eg 200 – "186" (=14) or 2 – "1.86" (=0.14) A1 for 14 cm, 0.14 m or 140 mm
	(b)		44	3	M1 for $320 \div 14$ (= 22.8... or 23) or $2 \times 320 \div 14$ (= 45.7... or 46) M1 (dep) for evidence of truncating "total DVDs" **down** to integer value, e.g. 22.8... to 22 or 45.7... to 45 A1 cao

Q2.

Question		Working	Answer	Mark	Notes
	(a)		–1, 0, 1, 2, 3	2	B2 for correct 5 values which may be in any order with no repeats (B1 four correct values and none incorrect or –2, –1, 0, 1, 2, 3)
	(b)	$3x > 11$ $x > 11/3$ or 3.66.. OR $(16 - 5) \div 3$ $11/3$ or 3.66..	4	3	M1 $3x > 11$ or $3x > 16 - 5$ or $3x + 5 - 5 > 16 - 5$ A1 $11/3$ or 3.6(66..) or 3.7 (Accept = or ≥ in place of >) B1 ft OR M1 $(16 - 5) \div 3$ A1 $11/3$ or 3.6(66..) or 3.7 B1 ft

Q3.

Question	Working	Answer	Mark	Notes
	8 km per 30 seconds = 16 km per minute = 16 × 60 = 960 km per hour 960 km/hr × 5 ÷ 8 = 600 miles per hour	600	3	M1 convert to km/h by × 2 × 60 or 960 seen or use of speed = distance ÷ time M1 convert distance to miles by × 5 ÷ 8 oe or sight of 5 miles A1 cao

Q4.

5MB3H_01 November 2015					
Question		Working	Answer	Mark	Notes
			1.01	3	M1 for 1.2×15 (= 18) or 1×250 clearly defined as mass M1 for $\frac{"18" + "250"}{15+250}$ A1 for 1.01(1…)

Q5.

Question		Working	Answer	Mark	Notes
			3.2 m - 5 m	3	M1 man's height seen as 1.6 m - 2 m oe or 5 ft 3 in - 6 M1 for 2 to 2.5 × 'man's height' A1 for 3.2 m - 5 m oe or 10 ft 6 in - 16 ft 6 in oe (units needed)

Q6.

PAPER: 5MB2H_01					
Question		Working	Answer	Mark	Notes
*			broke the record	5	M1 conversion between km and miles M1 for a first step to find comparable figures M1 for a complete method to find comparable figures A1 for correct comparable figures C1 (dep on first 2 M marks) for statement e.g broke the record with comparison of their figures

Q7.

		Working	Answer	Mark	Notes
			Points plotted at (5, 6), (15, 9), (25, 8), (35, 7), (45,5) and joined with line segments	2	B2 for correct plotting of 5 points and joining with line segments (B1 for points plotted correctly at midpoints of intervals OR joining points with line segments at the correct heights and consistent within the class interval (including end values) OR correct frequency polygon with one point incorrect OR correct frequency polygon with first and last point joined) NB Ignore any histogram drawn and any part of frequency polygon outside range of first and last points plotted

Q8.

PAPER: 5MB3H_01					
Question		Working	Answer	Mark	Notes
	(a)		$-2, -1, 0, 1, 2$	2	B2 for $-2, -1, 0, 1, 2$ (B1 for one error or omission)
	(b)		$x > 3$	2	M1 for isolating either the constant terms or algebraic terms or for $x = 3$ A1 cao

Q9.

PAPER: 5MB3H_01				
Question	Working	Answer	Mark	Notes
(a)		Inequality drawn	2	B2 for all three features of -2, O and right arrow (B1 for two of these features)
(b)		2	3	M1 for isolating the y terms A1 for $3y < 8$ or $3y = 8$ or better B1 ft

Q10.

Question	Working	Answer	Mark	Notes
		70.5	P1	starts process of Pythagoras e.g. $5^2 + 12^2$
			P1	complete process for Pythagoras e.g. $\sqrt{5^2+12^2}$ or $\sqrt{25+144}$ or $\sqrt{169}$ (=13)
			P1	(dep P1 for Pythagoras) process of adding all the lengths e.g. 5 + 5 + 12 + 12 + "13" (=47)
			P1	(indep) process of multiplying at least 2 lengths by 1.5
			A1	cao SC: any evidence of working with Pythagoras award the P1 or P2

Q11

Paper_5MB1F_01					
Question		Working	Answer	Mark	Notes
	(a)		23	1	B1 cao
	(b)		25	1	B1 cao
	(c)		Decreasing	1	B1 for decreasing, downward, falling, –3° etc

Q12.

		Working	Answer	Mark	Notes
	(a)		–3, –2, –1,0,1	2	B2 for all 5 values and no others (B1 for 4 correct values and no others or -4,-3,-2,-1,0,1 or -3,-2,-1,0,1,2
	(b)		$-2 \le x < 4$	2	B2 for $-2 \le x < 4$ (B1 for $-2 \le x$ or $x < 4$ or $-2 < x \le 4$) [Note: accept the use of any letter other than x throughout and ignore any attempt to list integer values]

Q13.

Question		Working	Answer	Mark	Notes
			32.5	3	M1 for 45 ÷ 30 (=1.5) or 1hr 30 min seen or for 20 ÷ 40 (=0.5 or 30min) M1 (dep) for (45 + 20) ÷ ("1.5" + "0.5") A1 cao

Examiner's Report

Q1. There were many fully correct responses in part (a) with students selecting the correct information from the question, adding the correct 5 lengths and dealing with a units conversion correctly. Errors did occur when students used only some of the given information: they typically used just one of each of the 32 cm and 45 cm lengths or ignored these numbers completely and carried out a division of 2m into 5 equal pieces. Where the correct numerical answer had been obtained, students only rarely lost a mark for omitting the appropriate cm or m units. Students appeared generally confident with conversion between metres and centimetres with a few choosing to work completely in millimetres.
Although part (b) had a functional maths context, this did not necessarily help some interpret the answers to division calculations correctly for the situation given. Many did not appreciate the need to consider each shelf separately and round **down** to the nearest integer. This led to many answers of 46 from rounding 320 ÷ 14 = 22.8... up to 23 on each shelf or working with both shelves together to give 640 ÷ 14 = 45.7… which was usually rounded up. For this functional question, the students needed to select just the relevant information about the shelf width from the diagram. Unfortunately, many included the height of the shelves in their calculations. An additional shelf width of 450 mm was often used and some students carried out an "area" calculation before dividing by 14 mm to give the somewhat unrealistic answer of 10285 DVDs.

Q2. In part (a), most candidates gained at least one mark giving at least 4 of the correct integers. There were some errors interpreting the difference between the inequality symbols with confusion as to whether -2 and 3 should be included. Some candidates appeared to have misunderstood the question and gave a final answer of 5 to indicate how many integers met the inequality. Candidate's answers for part (b) included both formal algebraic solutions and trial and improvement methods. Trial and improvement often yielded the correct integer answer from straightforward inspection whereas, many candidates who reached $^{11}/_{3}$ did not go on to give 4 as their final answer and so lost the final mark.

Q3. Many candidates knew that there was a relationship between speed, distance and time with the formula triangle diagram often seen although sometimes with speed or time at the top of the triangle. The most common error was either multiplying 30 by 8 or dividing 30 by 8.

Over half the candidates failed to score on this question even though it was seldom left blank. A third of the candidates did score 1 mark generally for successfully calculating 960 km/h but then progressed no further. The conversion from kilometres to miles was not well known. Many who wrote 5 miles = 8 km or 1 mile = 1.6 km often did not know how to apply this knowledge. Just under 10% of the candidates reached an answer of 600 miles per hour. In this type of question candidates should be encouraged to use common sense and to check that their answer is of a reasonable size for the vehicle being considered.

Q4. Very few correct answers were seen. Whilst many could take the first step in working out a mass (18 or 250 stated) the subsequent failing was an inability to realise that a division of 265 was needed for the total mass.

Q5. It was pleasing that many students gave sensible estimates for the height of the bus. These estimates were usually given in metres or in feet and inches. Students who did not have a sensible estimate for the height of the bus driver often achieved one mark for multiplying this height by a number in the range 2 to 2.5. Some of the students who estimated the height of the bus driver in feet and inches got into difficulties when attempting to multiply this height by 2, e.g. 5ft 7in × 2 = 10ft 14in or 5.7ft × 2 = 10.14ft. Some students worked only in centimetres, using actual measurements from the diagram, and some failed to include units with their answer.

Q6. This question was not well answered as most students could not deal with the complexity of changing between metric and imperial units and dealing with the number of seconds in an hour. Some students were able to change mph to km/h and some were able to change 1 km in 6 seconds to km/m but fully correct answers were rare.

Q7. There remains a lot of confusion about frequency polygons. Weaker candidates confuse them with bar charts, or plot the points at the ends of the interval. Others plot them as if a scatter diagram, without joining the points. What to do at the ends is a further confusion, and some joint the two end points. Candidates who drew a bar chart gained some credit if the midpoints of the top of the bars was indicated, but no credit if the corners were used instead. Candidates who superimposed a polygon on top of the bar chart could get full marks.

Q8. Many students taking this paper found part (a) of this question to be straightforward. Common errors included a confusion between the signs ≤ and <. Some students scored 1 mark because they omitted one of the values required or they included one extra value.

In part (b) of the question a large proportion of students were able to identify $x = 3$ as the critical value but far fewer were able to give the correct inequality, $x > 3$, as their final answer. It was interesting to see that many students gave their (correct) final answer in the form $3 < x$ rather than $x > 3$.

Q9. Part (a) of this question was not well done by most students. Common errors included drawing a line from −2 to the left, using a filled in circle at −2 and indicating a line of finite length which ended at 4. Not all students attempted part (b) of the question. Of those students who did attempt this part, a fair proportion of them got as far as obtaining the value $\frac{8}{3}$ and used this value in their final answer giving $\frac{8}{3}, y = \frac{8}{3}$ or $y < \frac{8}{3}$ on the answer line. Only a small number of students gave an integer answer with some of these students giving 3 as their answer. Some students employed a trial and error approach. A surprising number of these higher tier students made basic errors in the manipulation of the inequality. For example, "$4y - y < 7 - 1$" was commonly seen.

Q10.A significant minority of candidates found the area of the rectangle and then multiplied this by the 1.5, gaining no marks. However, the majority who used Pythagoras's theorem were successful in at least gaining the marks for a Pythagorean approach; some were unable to state the square root of 169. Many were able to go on and complete the question, though there were arithmetic errors, whether candidates found individual masses and added, or added the lengths first and multiplied by 1.5. When applying the latter method those finding it as 47+ 23.5 were more successful than those attempting to multiply 47 by 1.5. Some divided by 1.5 instead of multiplying while others included the diagonal twice, but overall this question was very well answered. Candidates need to read the question carefully; for example, an error for some was not appreciating that this was a rectangular frame as attempts to find the area were seen.

Q11. Usually a well answered question. However sometimes the answer given in (c) did not explicitly mention a downward or falling trend in temperatures.

Q12. This question also offered full marks to most. In part (a), some candidates failed to include the 0, or added −4 or 2 to their list of numbers. In part (b), weaker candidates often interchanged the signs. Some candidates offered a list of integers perhaps not recognising the change in requirement from part (a) to part (b). Not all candidates included a variable with their inequalities.

Q13. This question was well attempted but few achieved full marks. The majority of candidates either scored M2A1 or M0A0, with more candidates failing to realise the significance of the different speeds and the need to calculate the time of the journey first. Some achieved M1 for 45 ÷ 30 or 20 ÷ 40 but then reverted back to an incorrect method.