Countdown to your final Maths exam ... part 12 (2018)

Examiners Report & Markscheme

Mark Scheme

Q1.

Question	Working	Answer	Mark	Notes
	5 × 6 ÷ 2	$15cm^2$	3	M1 5 × 6 ÷ 2 oe seen A1 15 B1 cm^2

Q2.

PAPER: 5MB3H_01				
Question	Working	Answer	Mark	Notes
		2 000 000	2	M1 for 2 × 100 × 100 × 100 A1 oe

Q3.

Question	Working	Answer	Mark	Notes
	15 ÷ 3 × 4	20 cm	3	M1 for 4 × 5, 3 × 5 or $^{15}/_{3}$, $^{3}/_{15}$, $^{3}/_{4}$, $^{4}/_{3}$, or equivalent values, 4:20 oe, or identification of 5 as the scale factor of enlargement. A1 cao C1 (indep) for units: cm stated on answer line or with "20" in the working space if not given on answer line.

Q4.

Question	Working	Answer	Mark	Notes
		187	M1	for a method to find a missing length, e.g. 15 – 7 (= 8) or 22 – 9 (= 13) (may be seen on the diagram)
			M1	for a method to find the area of the triangle, e.g. ((15 – 7) × (22 – 9)) ÷ 2 (= 52) or to find the area of the rectangle, e.g. 9 × 15 (= 135)
			A1	cao

Q5.

Question	Working	Answer	Mark	Notes
		11.25	3	M1 for 40 ÷ 8 (= 5) M1 (dep) for finding the area of the triangle eg "5" × 4.5 ÷ 2 A1 cao

Q6.

5MB3F_01 November 2015				
Question	Working	Answer	Mark	Notes
(a)		A and G	1	B1 cao
(b)		F	1	B1 cao

Q7.

Paper 1MA1: 3F			
Question	Working	Answer	Notes
		48	P1 For start to process eg. $96 \div 12$ **or** $96 \div 2$ A1 cao

Q8.

Question	Working	Answer	Mark	Notes
		15 200	3	M1 for a method to obtain at least two different areas from 50×80 (= 4000), $\frac{1}{2} \times 40 \times 60$ (= 1200), 60×80 (= 4800) M1 (dep on M1) for adding at least 4 correct face areas A1 cao

Q9.

Question	Working	Answer	Mark	Notes
	$\sqrt{5^2 - 4^2} = 3$ $4 \times 8 = 32$ $32 + \frac{1}{2}(3 \times 8)$	44	5	P2 for $\sqrt{5^2 - 4^2}$ or for a height of 3 (P1 for $5^2 - 4^2$) P1 for process to find one area P1 for a complete process to find the total area A1 cao

Q10.

Question	Working	Answer	Mark	Notes
(a)		3.9	M1	for a ratio of $\frac{8.1}{5.4}$ (= 1.5) oe or $\frac{5.4}{8.1}$ (= 0.66..) oe or $\frac{2.6}{5.4}$ (= 0.48..) oe or $\frac{5.4}{2.6}$ (= 2.07..) oe
			A1	cao
(b)		2.05	M1	for $\frac{5.4}{8.1} \times 6.15$ (= 4.1) or $\frac{2.7}{8.1} \times 6.15$ oe or ft "scale factor" from (a)
			A1	cao

Q11.

Question	Working	Answer	Mark	Notes
		13 m^2	5	P1 process to find *FE* $(28 - 6 - 6) \div 2$ (= 8) or *AB* $(28 - 6 - 6 - 3 - 3) \div 2$ (= 5) P1 process to find area of a triangle $\frac{4 \times 8}{2}$ (= 16) or $\frac{6 \times 3}{2}$ (= 9) or $\frac{5 \times 4}{2}$ (= 10) or $\frac{2 \times 3}{2}$ (= 3) P1 complete process for shaded area e.g. $8 \times 4 + 2 \times 3 -$ ("16" + "9") or $\frac{5 \times 4}{2} + \frac{2 \times 3}{2}$ A1 cao C1 (indep) for m^2

Q12.

PAPER: 1MA0_1H					
Question		Working	Answer	Mark	Notes
	(a)		7.5	2	M1 for $\frac{12}{18}$ oe **or** $\frac{18}{12}$ oe **or** $\frac{12}{5}$ oe **or** $\frac{5}{12}$ oe A1 cao
	(b)		45	3	M1 for $\left("\frac{3}{2}"\right)^2$ oe or $\left("\frac{2}{3}"\right)^2$ oe M1 for complete method to find area of shaded region, eg $36 \times "1.5"^2 - 36$ A1 cao (SC B2 for 81)

Q13.

		Working	Answer	Mark	Notes
			40.5	3	M1 for 1.5×6 or 1.5 ×1.5 M1 for adding area of 5 or 6 faces provided at least 3 are the correct area A1 cao NB: anything that leads to a volume calculation 0 marks.

Q14.

Question		Working	Answer	Mark	Notes
		Triangular ends ½ × 5 × 12 = 30 ½ × 5 × 12 = 30 **Base** 20 × 5 = 100 **Vertical face** 20 × 12 = 240 **Slant face** 20 × 13 = 260 **Total area** = 30 + 30 + 100 + 240 + 260 OR (5 + 12 + 13) × 20 + 2 × ½ × 5 × 12	660	3	M1 for ½ × 5 × 12 (= 30) or 20 × 5 (= 100) or 20 × 12 (= 240) or 20 × 13 (= 260) M1 (dep) for adding at least 3 areas found from correct methods (of no more than 5 faces) A1 cao OR M1 for (5 + 12 + 13) × 20 or ½ × 5 × 12 (= 30) M1 (dep) for adding "(5 + 12 + 13) × 20" to at least "1 × ½ × 5 × 12" A1 cao Note: Sight of ½ × 5 × 12 × 20 or 600 (ie a volume calculation) scores no marks

Q15.

Question		Working	Answer	Mark	Notes
			618	4	M1 for a method to find an area which is part of the cross section M1 (dep) for a complete method to find the total area of the cross section M1 (dep M1) for their cross sectional area × 12 A1 cao **OR** M1 for a method to find the volume of cuboid, 8 × 8 × 12 (= 768) M1 for a method to find the volume of the triangular prism, ½ ×5 × 5 × 12(= 150) M1 (dep M2) for a complete method for the volume of the prism A1 cao

Q16.

		Working	Answer	Mark	Notes
		4.5 × 2 + 3 × 2 = 15 or 4 × 3 + 2 × 1.5 = 15 or 4 × 4.5 – 2 × 1.5 = 15	7	4	M1 for a correct method to calculate at least one area using correct dimensions M1 for a complete method to find the total area (can be implied by 15) M1 for "15" ÷ 2.25 (=6.66…) or 2.25 × 6 (=13.5) or 2.25 × 7 (=15.75) or repeated addition to within 2.25 of "15" C1 (dep on at least 1 method mark) for 7 packs clearly identified and supported by their calculations

Q17.

Question	Working	Answer	Mark	Notes
(a)		4	P1	for process to find area of at least 2 different faces, e.g. 95 × 18 and 80 × 18
			P1	for a complete process to find the surface area of one cushion, e.g. (95 × 18 + 80 × 18 + 95 × 80) × 2
			P1	for process to convert units, e.g. 80 ÷ 100 (= 0.8)
			P1	(dep on P2) for their area multiplied by 6 and divided by 4
			A1	cao
(b)		Reduces requirement	P1	for showing 4.4 is now covered or 2.93 tins or 3 tins
			C1	(dep) Statement that the number required of tins will be reduced

Q18.

PAPER: 5MB2F_01					
Question		Working	Answer	Mark	Notes
*			NO figures and comparisons	5	M1 for 100×40×60 (= 240 000) M1 for "240000" ÷ 8000 (= 30) M1 for "30" × 2.50 (= 75) A1 for 240 000 and 75 C1 (dep on M1) for comparing the cost of grit with £70 ft their working OR M1 for 70 ÷ 2.50 (= 28) M1 for "28" × 8000 (= 224 000) M1 for 100 × 40 × 60 (= 240 000) A1 for 240 000 and 224 000 C1 (dep on M1) for comparing values of grit needed with that which can be bought for £70 ft their working

Examiner's Report

Q1. Over 80% of candidates were able to work out the area of the triangle though a significant minority of candidates evaluated 5 × 6 but did not divide by 2. One mark was awarded for stating correct units. Approximately 70% of candidates were awarded this mark. Where it was not awarded this was usually because units were omitted rather than wrong units were given, though "cm" was seen frequently. Centres are reminded to advise candidates that units are not always explicitly requested in a question but should be given where appropriate.

Q2. A few students scored both marks for a correct answer to this question. The most common incorrect responses seen were 200 and 8 000 000 (200 × 200 × 200).

Q3. Many candidates found this question straightforward with over 70% of them obtaining at least 2 out of the 3 marks available. Where candidates did lose one mark it was often because they omitted units (cm) in their answers. Conversely there were candidates who scored 1 mark for correct units but did not have a correct method to find the length of the enlarged photograph. A small number of candidates successfully found the length then went on to calculate the perimeter or area of the photograph.

Q4. No Examiner's Report available for this question

Q5. Instead of using the area of the rectangle to work out the length of *BD*, many students assumed it to be 4.5 cm and gained no marks at all. Those who worked out the length of *BD* as 5 cm often went on to work out the area of the triangle correctly. The most common error was not dividing by 2 after multiplying 4.5 by 5. Pythagoras' Theorem was often used to calculate the length of *CD* which was not needed.

Q6. Well answered.

Q7. No Examiner's Report available for this question

Q8. Students often find working with two dimensional representations of three dimensional shapes very difficult and in this question they struggled to decide which lengths they needed to multiply to find the area of the surfaces. The most common mistake was to multiply the 40 cm altitude by 50 or 80 and if they used 60 cm they then frequently forgot to divide by 2 to find the cross sectional area. Other common errors were 50 × 60 and 40 × 80 probably as they were adjacent on the diagram. It was very rare to see a completely correct solution to this question. However, some managed to gain the first mark for finding at least two different areas, usually the rectangular faces.

Q9. No Examiner's Report available for this question

Q10. Students taking this paper seemed unfamiliar with the techniques needed to solve problems such as this involving similar triangles. It was rare to see an attempt involving the use of scale factors or ratios. Instead, many students mistakenly thought they could apply Pythagoras's theorem to one of the triangles despite there being no indication they were right-angled. A sizeable proportion of students merely subtracted lengths to find *AE*, for example, 8.1 − 2.6 = 5.5. 2.6 was quoted as the length of *AE* by some students and examiners wondered whether they had confused the arrows on sides *EA* and *DB* with the notation used for showing lengths are equal. Students may have found it helpful to redraw the diagram as two separate similar triangles.

Q11. No Examiner's Report available for this question

Q12. Few students were able to score more than 2 marks in this question. In part (a), most of those students who appreciated that trapezium *ABCD* is an enlargement of trapezium *AEFG*, and stated the scale factor, eg $\frac{18}{12}$, were then able to work out the length of the side *AB* correctly. By far the most common incorrect approach, however, was to work out the difference in the lengths of the sides *BC* and *EF* (to get 6) and add this to the length of *AE* (to get 11). In part (b), relatively few students knew that they were required to use the area scale factor for the enlargement. A common incorrect approach was to increase the area of trapezium *AEFG* by the linear scale factor (to get 54) and then either give this as the final answer, or subtract 36 from this to get an incorrect final of 18. A significant number of those students who appreciated that they needed to use the area scale factor for the calculation were unable to do this correctly, eg by not being able to calculate 1.5 × 1.5 correctly, or by giving the final answer as the total area of the trapezium *ABCD* rather than as the shaded area. A very common incorrect approach was to use the area of a trapezium formula in an attempt to find the areas.

Q13. There was evidence that some candidates did not read the question with enough care with many calculating the volume instead of the surface area. Of those who worked with area, common errors included poor arithmetic, adding together edges instead of areas, and a failure to include all 6 sides.

Q14. A great many candidates, even at this level, still do not know how to find the area of a triangle; 12 × 5 = 60 cm^2 was often seen, and candidates would repeat this for the second triangular end. Many candidates again did not read the question carefully and attempted to find volume. Some candidates who did correctly work out the area of the front triangular end at 30 cm^2 then worked out ½ × 13 × 5 for the triangular end at the back. Other errors were often made by candidates not attempting to find the area of all of the 5 faces. Many candidates made the incorrect assumption that all three of the rectangular faces were identical, usually 20cm by 13cm.

Q15. This was a well understood question as almost all students realised they had to find the area of the cross section and multiply it by the length however many students had difficulty with the sloping section of the prism. Some tried to use the area of a trapezium formula on the pentagonal cross section whilst others forgot to divide by two when they split the shape into two rectangles and a triangle and gave the triangle area as 5 × 5 and not $\frac{1}{2}$ × 5 × 5.

Some also did not realise that if they used two 8 × 3 rectangles the two rectangles would overlap. There were a few attempts made to work by subtracting the 5 × 5 × 8 triangular prism from the square prism with 8 × 8 cross section but these were usually unsuccessful too.

Q16. This question was well attempted by most candidates, though poor arithmetic when calculating the area did prevent some candidates from achieving full marks. Most candidates opted to cut the shape into two rectangles adding the areas to get 15 then diving by 2.25 and most chose to use repeated adding to find 15 ÷ 2.25. These candidates were the most successful. A few candidates chose to divide the individual areas by 2.25 and then add the areas. This usually worked unless candidates rounded before adding, which in some cases, led to incorrect answers. Candidates who decided to calculate the area of the shape using subtraction of areas were less successful. Weaker candidates calculated the perimeter. Virtually all candidates remembered to finish their answer which a short sentence stating the number of packs required.

Q17. No Examiner's Report available for this question

Q18. Many students showed a suitable strategy to answer this question and a pleasing number of fully correct responses were seen. Arithmetic errors, though, were very common. Most students showed a correct method to work out the volume of the box but 60 × 100 × 40 was sometimes worked out as 24 000, not 240 000. Dividing 240 000 by 8000 proved problematic for some, as did dividing 70 by 2.50 for those students who decided to work out how many bags of grit could be bought for £70.