JustMaths

Countdown to your final Maths exam ... part 4 (2017)

Examiners Report & Markscheme

Examiner's Report

Q1. Pythagoras' Theorem questions are also firm favourites on these papers and here again candidates did not score as well as they might have done. They made the usual mistakes of doubling instead of squaring, dividing by 2 instead of square rooting, adding the lengths instead of the squares of the lengths and even subtracting the squares of the given lengths. There was some evidence of candidates trying to use scale drawing but these were almost always unsuccessful as the required accuracy of the answer was too great for their drawing.

Q2. No Examiner's Report available for this question

Q3. No Examiner's Report available for this question

Q4. No Examiner's Report available for this question

Q5. The majority realized that the diagonal was to be found using Pythagoras. Weaker candidates doubled rather than squaring in calculating Pythagoras. Those who failed to choose Pythagoras as a method either guessed the length of the diagonal, or estimated its length from the two given sides. If made clear, they could then gain some credit from calculating the total of their six lengths.

Q6. No Examiner's Report available for this question

Q7. Candidates understood they had to find the missing side *AB* in this right angled triangle but often just added the two sides of 32 and 24. Only about a third of candidates realised they had to square and add the lengths if the right angled triangle with many subtracting instead. In part (b) a lot of the candidates assumed they had to find the areas of the two mirrors rather than find the perimeter of the mirrors and so scored no marks. Very few candidates were able to give a fully correct solution to this question though partial credit was often earned for trying to find the circumference of the circle and the perimeter of the triangle. Those who did try to find the perimeter did not take account of the fact that the metal strip is sold in lengths of one metre when trying to find the cost. Most candidates did not associate part (a) with part (b).

Q8. This question was designed to assess the Theorem of Pythagoras in a functional setting which required students to communicate their working and to reach a conclusion. Only a minority of students recognised this. Those that did work out the missing side from $10^2 + 7^2$ generally progressed to get full marks, although one or two miscalculated the perimeter by adding on the extra 7 they had written down to find the missing side or adding the perimeter of the rectangle they had drawn to the perimeter of the triangle they had used. Some students wrote down 12 after finding $\sqrt{149}$. They then used the 12 to find that the perimeter was 51 m and reach a suitable conclusion about the fence. This was allowed as being an appropriate course of action in this case.
Many students had no feel for the problem at all and attempted to calculate areas – often they thought the demand was about using the trapezium rule so demonstrating they had no understanding of the difference between area (the amount of space inside a region) and perimeter (the total length of all of the edges of the region)

Q9. No Examiner's Report available for this question

Q10. This question was poorly done except by the most able candidates. The vast majority only managed to gain the first method mark for Pythagoras and generally $AC = 5$. Very few recognised the need to use trigonometry and many attempted to use the cosine formula badly. Of those who did use trigonometry, the sine rule was seen most commonly.

Q11. This question was well attempted and blank responses were rare. Despite the circle most candidates realised that Pythagoras was needed to find the diameter and then went on to find the circumference though a few stopped after finding the diameter forgetting that the question required them to find the circumference. Students were confusing circle formulae and some were finding the area or misremembering the formula completely. The small number of students lost one mark due to premature rounding of their value for the diameter. Only the very weakest students were failing to score any marks usually due to not using Pythagoras at all.

Q12. No Examiner's Report available for this question

Q13. No Examiner's Report available for this question

Q14. This question was poorly answered. Many gained 1 mark for finding the area of the circle but finding the area of the square proved to be beyond the majority of students. An incorrect method of 6 × 6 was frequently seen but less understandable on a Higher tier paper was the number of students who worked out 6+6+6+6 or 6×6×6×6 for the area. Some students worked out the area of the square by first finding the area of one of the triangles and some used Pythagoras's theorem to find the side length of the square. Those using Pythagoras sometimes rounded the side length before working out the area of the square and lost accuracy. It is disappointing when students fail to understand that $(\sqrt{72})^2$ gives 72, not 71.9 or a similarly rounded figure. Some students found an area for the square that was greater than the area of the circle and went on to subtract the area of the circle from the area of the square.

Q15. No Examiner's Report available for this question

Q16. No Examiner's Report available for this question

Q17. No Examiner's Report available for this question

Mark Scheme

Q1.

		Working	Answer	Mark	Notes
			26.7	3	M1 for (GJ^2 =) $24.5^2 + 10.6^2$ or 600.25 + 112.36 or 712.61 M1 for $\sqrt{24.5^2 + 10.6^2}$ or $\sqrt{712.61}$ A1 26.69 – 26.7

Q2.

Question	Answer	Notes
	No with reasoning	M1 Derive AC=9 cm and identify as hypotenuse M1 $4^2 + 7^2$ A1 for using eg $AC = \sqrt{4^2 + 7^2}$ or 65 and 81 C1 for concluding explanation that ABC is not a right-angled triangle with evidence.

Q3.

Paper 1MA1: 3F			
Question	**Working**	**Answer**	**Notes**
(a)	$\frac{388-320}{320} \times 100 =$	21.25	M1 For a complete method A1 21.25%
(b)	A 388 (million) ÷ 3200 = £0.12125 million (£121 250) B 57(million) ÷ 640 = £0.0890625 million (£89062.50)	Company A + evidence	M1 Method to find sales/person for A or B for 2014 A1 £121 250 or £89062.50 C1 Company A with £121 250 and £89062.50

Q4.

Paper 1MA1: 2H			
Question	**Working**	**Answer**	**Notes**
		33.8	P1 for recognition of similar triangles or equal ratio of sides P1 for process to find CB, eg. $\frac{5}{13} = \frac{13}{CB}$ A1 for 33.8

Q5.

Question		Working	Answer	Mark	Notes
		$\sqrt{39^2 + 52^2}$ = $\sqrt{4225}$ = 65 2×65 + 2×39 + 2×52 = 156×2 = $\sqrt{39^2 + 52^2}$ = $\sqrt{4225}$	312	5	M1 for $39^2 + 52^2$ or 1521 + 2704 or 4225 M1 for $\sqrt{39 \times 39 + 52 \times 52}$ or $\sqrt{1521 + 2704}$ or $\sqrt{4225}$ A1 for 65 seen or diagonal length of 65 (oe) indicated on diagram, or other Pythagorean length justified. M1 for 2 × "65" + 2 × 39 + 2 × 52 (= 156 × 2) or 130 + 182 A1 cao

Q6.

Question	Working	Answer	Mark type	AO	Notes
		38p	P	3.1d	P1for a correct first step, e.g. 140 × 6 (= 840 eggs per week)
			P	3.1d	P1 for a correct process to find the weight of feed per week, e.g. 100 × 140 × 7 (= 98000g or 98 kg)
			P	3.1d	P1 for a correct method to find the weekly cost, e.g. 6.75 ÷ 25 × "98" (= £26.46)
			P	3.1d	P1 for completing the process to find the cost of feed required for 12 eggs, e.g. (2646 ÷ 840) × 12 = 37.8p
			A	1.3b	A1 for 37.8p or 38p oe

Q7.

PAPER: 1MA0_2F					
Question		Working	Answer	Mark	Notes
	(a)		40	3	M1 for $32^2 + 24^2$ M1 for $\sqrt{1600}$ or $\sqrt{(32^2 + 24^2)}$ A1 cao
	(b)		22.72	4	M1 for use of $\pi \times 60$ oe M1 for method to calculate perimeter of triangle, eg 2 × '40' + 48 (=128) M1(dep M2) for complete method to find total length of strip for both mirrors or to find the cost of strip for one mirror, eg 2 × £5.68 A1 for £22.72 from correct working

Q8.

Question		Working	Answer	Mark	Notes
*			No not enough	5	M1 for substituting into Pythagoras' theorem M1 for complete correct use of Pythagoras' theorem M1 for a complete method to find the perimeter of their trapezium A1 51.(20655..) C1 (dep on correct first 2 M marks) for correct conclusion dependent upon supporting calculations

Q9.

Paper 1MA1: 1F			
Question	Working	Answer	Notes
		7.50	M1 60 ÷ 8 A1 accept 7.5

Q10.

		Working	Answer	Mark	Notes
			4.6	5	M1 for $AC = \sqrt{(32+42)}$ (=5) or $DA = \sqrt{(52+22)}$ M1 for tan BAC = 0.75 oe or (BAC=) 36.8(6) or 36.9 M1 for tan DAC = 0.4 oe or (DAC=) 21.8(0) M1 for $\sqrt{'5'^2+2^2}$ × sin("36.8(6)"+"21.8(0)") or 5.385 × sin 58.7 A1 for 4.59 – 4.61 OR M1 for $AC = \sqrt{3^2+4^2}$ (= 5) or $DP = \sqrt{(29 - AP^2)}$ M1 for cos BAC = 0.8 oe or (BAC=) 36.8(6) oe M1 for angle CDP = angle BAC M1 for (DP=) 3 + 2×cos CDP or (AP=) 4 – 2×sin CDP A1 for 4.59 – 4.61

Q11.

5MB3H/01 June 2015				
Question	**Working**	**Answer**	**Mark**	**Notes**
		29.6	4	M1 for $8^2 + 5^2$ or 64 + 25 or 89 M1 (dep) $\sqrt{"8^2"+"5^2"}$ (=9.4) M1 for "9.4..." × π A1 for 29.5 – 29.65

Q12.

Question	Working	Answer	Mark	AO	Notes
	Cost price is £50 Total number is 120 $\frac{2}{3} \times 120 = 80$ Income from these is 60p × 80 = £48 Income from the remainder is 30p × 40 = £12 Profit = £48 + £12 – £50	£10	P P P P A	3.1d 3.1d 3.1d 3.1d 1.3b	P1 for a process to find the total cost of 10 boxes of drink and the total number of cans bought, e.g. 10 × 5 (=50) and 10 × 12 (=120) P1 for a process to find the number of cans sold for 60p, e.g. $\frac{2}{3} \times$ '120' (= 80) oe P1 for a process to find the cost of cans sold for 60p e.g. '80' × 60p (= £48) oe P1 for a process to find the cost of their remaining cans at 30p each, e.g. (120 – '40') × 30p oe A1 cao

Q13.

Paper 1MA1: 2F			
Question	**Working**	**Answer**	**Notes**
		43.5	P1 For process to establish a right-angled triangle with two sides of 5 cm and 9 – 7 = 2 cm P1 For correct application of Pythagoras, eg. $5^2 + "2"^2$ P1 for a complete process to find perimeter, eg. 9 + 7 + 5 + "5.39" (= 26.385...) P1 for process to find area of square, eg. $(26.385... \div 4)^2$ A1 for answer in range 43.5 to 43.6

Q14.

PAPER: 1MA0/2H				
Question	**Working**	**Answer**	**Mark**	**Notes**
	$\pi \times 6^2 - 2 \times 6 \times 6$	41.1	4	M1 for correct method to work out the area of the circle or quarter circle or semi-circle eg $\pi \times 6^2$ (=113(.09..)); $\pi \times 6^2 \div 2 = 56.5(4..)$; $\pi \times 6^2 \div 4 = 28.2(7...)$) M1 for method to work out the area of the square (=72) oe or a triangle eg ½×6×6 (=18) M1 for complete method to find shaded area. A1 for value in the range 41.04 - 41.112

Q15.

Paper 1MA1: 1F				
Question	**Working**	**Answer**	**Notes**	
(a)		2000	P1	Evidence of estimate eg. 400 or 20 used in calculation
			P1	complete process to solve problem
			A1	
(b)		Overestimate with reason	C1	ft from (a) eg. overestimate as two numbers rounded up

Q16.

Question	Working	Answer	Notes	
		complete chain of reasoning	C1	starts chain of reasoning eg finds area of large square and area of triangle or use of Pythagoras
			C1	for $(x+y)^2 - 4\times(x\times y\div 2)$ oe or $\sqrt{x^2+y^2} \times \sqrt{x^2+y^2}$
			C1	complete chain of reasoning with correct algebra

Q17.

Question	Working	Answer	Mark type	AO	Notes
(a)	$4x = 3x + 6$ $x = 6$ 4×6	24 (cm)	P	3.1b	P1 for translating the problem into an algebraic equation, e.g. $x + x + x + x = x + 2 + x + 2 + x + 2$ oe
			P	3.2	P1 for collecting terms and solving for x oe
			A	1.3b	A1 24 cao
(b)	$y^2 = 6^2 + 6^2$ $y = \sqrt{72}$ $z^2 = 8^2 - 4^2$ $z = \sqrt{48}$	$y > z$ with reason	P	2.3a	P1 for interpreting information, e.g. numerical values for sides on square and triangle
			M	1.3b	M1 for a correct method to find y or z
			M	1.3b	M1 for a correct method to find y and z
			C	2.1a	C1 conclusion based on at least P1 consistent with candidate's figures for y and z or y^2 and z^2

Q18.

Question	Working	Answer	Mark type	AO	Notes
		£458.85 or £454.86	P	3.1d	P1 for a correct process to find number of sachets used in a year, e.g. 5×365 (= 1825) or 5×366 (= 1830)
			P	3.1d	P1 for a correct process to find the number of packs required, e.g. "1825" ÷ 16 (= 114 or 115) or "1830" ÷ 16 (= 114 or 115)
			P	3.1d	P1 for recognising the need to round up or down to ensure a whole number value £3.99 × 115 (or 114)
			A	1.3b	A1 for £458.85 or £454.86