JustMaths

Countdown to your final Maths exam ... part 3 (2019)

"Working Above"
Markscheme & Examiners Report

Q1. Over 60% of candidates scored full marks in this question. A further 20% of candidates gained one mark, usually for getting the x coordinate correct. Very little evidence of a formal method was seen in the working space, but where there was some indication, incorrect approaches included finding the difference between the x coordinates and between the y coordinates, finding the average of the two coordinates for each point and attempts at finding the mean of 3.8 and 7.5

Q2. This question was, in most cases, poorly answered with few students being able to find all 3 of the elements of the coordinates of B. Some did gain one mark for finding two of the elements.

Q3. In part (a) most understood that they needed to find halfway between the coordinates. Some found half of the difference between the co-ordinates rather than the mean. Most candidates found at least one value. Responses to part (b) were disappointing. Common errors included confused signs and incorrect division, and even mixing x and y coordinates.

Q4. No Examiner's Report available for this question

Q5. This proved to be a very difficult question for candidates and fully correct solutions were rare. Relatively few candidates knew that the gradient of the perpendicular line is given by $-1/m$. Many of those who got as far as $y = 1/3x + c$ did not show the substitution of $x = 6$ and $y = 3$ to find the value of c.

Q6. No Examiner's Report available for this question

Q7. Many candidates worked out the x distance and the y distance from A to C, giving the answer (9, 18), failing to recognise that they needed to add these values to A (2, 3) to get the coordinates of C. Many were not able to work on their own initiative to solve this question.

Q8. This question was not well understood. Partial marks were awarded for a few students who were able to establish the coordinates of B as (0, 5) and/or C as (10, 0).

Q9. Few candidates understood what was needed to gain an equation from the information given. Many thought that the question required them to work with the co-ordinates. Some deduced the gradient of AB as 2 (though some stated this as -2). Having taken this step, most of these then wrote down the gradient of the perpendicular line. Unfortunately few were then able to correctly carry out a substitution to find "c".

Q10. This question was done well by a good number of candidates, however there were also a surprising number of incorrect answers. A common error which lost a mark was in giving the coordinate without the brackets. A small number of candidates listed the values between 2 and 6, and from 3 to 8 and "found" the midpoint by crossing off matching values from each end of their lists. For the most part, this was done successfully. The most common incorrect approach observed was to subtract the two coordinates and this gave an answer of (4, 5). A few candidates attempted to complete this question by labelling the axes despite the

diagram being labelled as not to scale.

Q11. This question was quite well answered and examiners saw many correct equations for the line L.

In cases where the final answer was not correct, it was often possible for examiners to award partial credit to students who found the coordinates of the midpoint of AB and/ or who made progress in finding the gradient of the line perpendicular to AB.

Many errors were seen when students attempted to find the value of c in $y = mx + c$ by substituting the point (3, 7).

Q12. Very few candidates showed real understanding of the concepts involved in this problem. Many tried to rearrange the given equation $x + 2y = 5$, very rarely was $y = -½ x + 2.5$ the outcome. Some candidates did however realise the need to divide their gradient from their rearranged equation into -1 to get the gradient of a perpendicular, but again very few were then able to relate this to the given point through which the required perpendicular passed. Attempts at drawing the original line and then the perpendicular were seen but were very often of no help to the answer. Many students attempted to find an answer by substituting (3, 7) into the original equation.

Q13. No Examiner's Report available for this question

Q14. This question was not answered very well as many students found the mid-point of the line MP.

Those who did try to find the co-ordinates of Q often gave the correct answer or gained part marks for either calculating one coordinate correctly or finding the difference between the x or y coordinates of M and P. A good number of students made errors but then realised from the diagram that they needed to check and were able to correct their answer and score full marks. This is good exam technique and is to be encouraged.

Q15. Most students got as far as finding the coordinates of M but no further. This did not score any marks. It was evident that students struggled with finding the equation. Few of those students that attempted to find the gradient of AB recognised that the gradient should be negative and even fewer students knew how to find the equation once they had found the gradient.

Q16. Part (a) was done quite well. Many candidates were able to use the given gradient and the intercept on the y-axis to correctly write down the equation of the straight line. A common and perhaps surprising error was to omit "y" when writing down the equation of the straight line, eg $4x + 2$ or $L = 4x + 2$.

In part (b), many candidates were able to identify the need to use a gradient of 4 but few could use the given point $(2, -6)$ correctly to find the constant c. A common incorrect answer here was $y = 4x - 6$, ie interpreting -6 as the intercept on the y-axis.

Q1.

Question	Working	Answer	Mark	Notes
	$\frac{3+7}{2}$, $\frac{8+5}{2}$	(5, 6½)	2	M1 for either x or y coordinate correct or $\frac{3+7}{2}$, $\frac{8+5}{2}$, both seen but not correctly evaluated A1 for (5, 6½) oe

Q2.

PAPER: 5MB2H_01					
Question		Working	Answer	Mark	Notes
			(–3, –12, –1)	2	B2 cao B1 for two out of three coordinates correct

Q3.

		Working	Answer	Mark	Notes
	(a)		(3, 3.5) oe	2	M1 for a correct method to find the value of either the x coordinate or the y coordinate of the midpoint **or** $x = 3$ **or** $y = 3.5$ A1 cao
	(b)		-1.8 oe	2	M1 for correct method to find the gradient OR (+)1.8 A1 for -1.8 oe

Q4.

Question	Working	Answer	Mark	Notes
		$y = 3x - 1$	M1	for $y = 3x + c$ or a line drawn with gradient 3 passing through A
			A1	oe

Q5.

Question		Working	Answer	Mark	Notes
		Grad = ⅓ $3 = 6 \times ⅓ + c$ $c = 1$	$y = ⅓x + 1$	3	M1 for $–3 \times m = –1$ oe or ⅓ seen M1 for $3 = 6 \times$ '⅓' + c or $y – 3 =$ '⅓'$(x – 6)$ A1 for $y = ⅓x + 1$ oe

Q6.

Question	Working	Answer	Mark	Notes
		22	P1	Process to use gradient, e.g. $\frac{d-10}{5-2} = 4$
			P1	for a complete process to rearrange equation formed to isolate d
			A1	cao

Q7.

		Working	Answer	Mark	Notes
			(11, 21)	3	M1 for 5 – 2 or 9 – 3 OR 3 or 6 as long as these are not related to the 3 from *A* or multiple 3 or 9,18 M1 for 2 + 3 × "3" and 3 + 3 × "6" OR for 5 + 2 × "3" and 9 + 2 × "6" OR for 2 + 3 × "3" (=11) and (*y*=) 2 × '11' – 1 A1 cao SC: B1 if no method shown and answer shows *x* coordinate as 11 or *y* coordinate as 21.

Q8.

PAPER: 5MB2H_01					
Question		Working	Answer	Mark	Notes
			$y=\frac{10}{3}x+\frac{130}{3}$	5	B1 for stating B as (0, 5) or $OB=5$ (could be written on the diagram) B1 for C as (10, 0) or $OC=10$ (could be written on the diagram) or A is (-10, 10) or ft from their BC M1 gradient of $DA=\frac{10}{3}$ or $y=\frac{10}{3}x+c$ M1 for substitution of $x=-13,\ y=0$ or $x=-10, y=10$ in their equation A1 $y=\frac{10}{3}x+\frac{130}{3}$ oe

Q9.

Question		Working	Answer	Mark	Notes
		Gradient of *AB* = 2 Gradient of perpendicular line = – ½ $y = -\frac{1}{2}x + c$ $-1 = -\frac{1}{2} \times 5 + c$ $c = \frac{3}{2}$	$y = -\frac{1}{2}x + \frac{3}{2}$	4	M1 for attempt to find gradient of AB M1 (dep) for attempt to find gradient of perpendicular line eg use of -1/m M1(dep on M2) for substitution of *x* = 5, *y* = – 1 A1 for $y = \frac{1}{2}x + \frac{3}{2}$ oe

Q10.

PAPER: 1MA0_2H					
Question		Working	Answer	Mark	Notes
			(4, 5½)	2	M1 for $\frac{2+6}{2}$ or $\frac{3+8}{2}$ or 4, 5½ without brackets A1 for (4, 5½) oe NB: (4,5) gets 0 without working

Q11.

Question		Working	Answer	Mark	
			$y=-\frac{1}{2}x+\frac{17}{2}$	4	M1 for M = $\left(\frac{2+4}{2},\frac{5+9}{2}\right)$ (= 3,7) M1 for gradient = $-\frac{1}{m}$ or $-\frac{1}{2}$ oe M1 (dep on 1st M1) for substitution of x = "3", y = "7" into their equation A1 for $y=-\frac{1}{2}x+\frac{17}{2}$ oe

Q12.

Question		Working	Answer	Mark	Notes
		y = – ½ x + 2.5 mm' = –1 shows gradient is 2 y = 2x + c goes through (3, 7) 7 = 2 × 3 + c	y = 2x + 1	4	M1 for establishing gradient of original line is – ½ or sight of y = – ½ x + c M1 (indep) for (gradient of perpendicular) × "– ½ " = –1 This can be implied by a gradient of 2 or ft on "– ½ " M1 (dep on the previous M1) for substituting (3, 7) into y = "2"x + c A1 for y = 2x + 1 (or equivalent algebraic equation)

Q13.

Paper 1MA1: 3H			
Question	**Working**	**Answer**	**Notes**
		A and D	C1 in any order

Q14.

Question	Working	Answer	Mark	Notes
		–3, –2	2	M1 for $x=-3$ or $y=-2$; for finding the difference between the x or y coordinates of M and P (eg ±4 or ±4.5); for $\frac{x+5}{2}=1$ or for $\frac{y+7}{2}=2.5$ A1 for $x=-3, y=-2$

Q15.

5MB2H_01 November 2015					
Question		**Working**	**Answer**	**Mark**	**Notes**
			$y=\frac{3}{2}x-\frac{5}{2}$	4	M1 for attempt to find gradient of AB M1 (dep) for attempt to find gradient of perpendicular line eg use of $-\frac{1}{m}$ M1 for substituting $x=3, y=2$ into y = "m" x + c A1 for complete correct equation $y=\frac{3}{2}x-\frac{5}{2}$ oe

Q16.

PAPER: 5MB2H 01					
Question		Working	Answer	Mark	Notes
	(a)		$y = 4x + 2$	2	B2 for $y = 4x + 2$ oe (B1 for $y = 4x + c$ or $4x + 2$ or $L = 4x + 2$)
	(b)		$y = 4x - 14$	3	B1 for gradient = 4 M1 for $-6 = '4' \times 2 + c$ or $y - -6 = '4'(x - 2)$ A1 for $y = 4x - 14$ oe