"BETWEEN PAPERS" PRACTICE

SET 4 OF 4 (HIGHER ONLY)

SUMMER 2018

EXAMINERS REPORT & MARKSCHEME

NOT A "BEST" GUESS PAPER.

NEITHER IS IT A "PREDICTION" ... ONLY THE EXAMINERS KNOW WHAT IS GOING TO COME UP! FACT!
YOU ALSO NEED TO REMEMBER THAT JUST BECAUSE A TOPIC CAME UP ON PAPER 1 IT MAY STILL COME UP ON PAPERS 2 OR 3 ...

WE KNOW HOW IMPORTANT IT IS TO PRACTICE, PRACTICE, PRACTICE .... SO WE'VE COLLATED A LOAD OF QUESTIONS THAT WEREN'T EXAMINED IN THE PEARSON/EDEXCEL 9-1 GCSE MATHS PAPER 1 BUT WE CANNOT GUARANTEE HOW A TOPIC WILL BE EXAMINED IN THE NEXT PAPERS ...

ENJOY!
MEL & SEAGER

Q1. A pleasing number of students went all the way to $x + 2$, a fully simplified expression was not necessary and full marks were awarded prior to simplification. A common error was for students to write $x + 10 - 4$ not referencing x for each person. A few forgot to include x for Alex. The brackets were occasionally missed but it was more common to see the answer given as an algebraic fraction. The use of algebraic fractions was pleasing to see.

Q2. This question was well attempted by students and they were gaining the full range of marks. The weakest candidates often gained a mark for finding an angle but usually could not see how to proceed to find TR with many drawing in extra lines to create what they assumed to be right-angled triangles or made assumptions that their lines had bisected angles and so led to incorrect final answers. The slightly more able usually correctly used the Sine Rule to find the length of AR but were unable to then correctly use the Cosine Rule or tried to apply the Sine Rule again so only gained three marks. The most able students were able to correctly apply both the Sine and Cosine rule but some lost the accuracy mark due to premature rounding in their working out.

Q3. No examiners comment

Q4. Part (a) was done quite well. Many students were able to draw a correct cumulative frequency diagram for the information given in the table. Common errors were due to misinterpreting the vertical scale, particularly at (40, 138) and (60, 186), plotting points at mid-interval values, and careless drawing of the graph, such that the curve did not pass through all the points. Students should be advised to take more care when drawing cumulative frequency graphs and ensure that these pass through all the plotted points.
In part (b), many students were able to use either their cumulative frequency graphs, or the information given in the table, to comment on the accuracy of the given statement. Most students used the given percentage (10%) to calculate a frequency to compare, ie 20, rather than use a frequency from the table/cumulative frequency graph to calculate a percentage to compare, eg 5%. When reading values from a cumulative frequency graph, students should be advised to show their working by drawing clear lines between the axes of the graph and the graph

Q5. This question was not attempted by all candidates suggesting possibly that this topic had not been covered by all centres. When answers were seen it was evident for part (a) that most students had a good appreciation of the process of iteration and successfully secured the first mark for putting the starting value of −2.5 into the iteration formula. Sadly, wrong answers appeared to come from the incorrect squaring of negative numbers. Students could avoid this error by placing negative numbers in brackets on their calculator. By showing their substitutions students could gain 2 marks. This question exemplifies the need for students to show their working out especially when the calculator is used heavily to ensure that method marks can be awarded.

Part (b) was not well answered. Some students did state that the equation had been re arranged to give the iterative formula. Others correctly stated that iteration provides convergence towards a root of the cubic equation. A common misconception in part (b) was that the 3 answers from iteration in part (a) provided the 3 solutions to the cubic equation.

Q6. As this question only involved positive terms most candidates were able to successfully expand a pair of brackets usually the first two brackets $(x + 1)(x + 2)$ although a few still made arithmetical errors with multiplying simple values like 1×2 and writing 3 as their answer. Once one set of brackets had been expanded candidates generally seemed to be able to then expand this over a third bracket and were more successful when systematically multiplying each term across the bracket. They usually also then went onto get the second method mark for at least half the terms written correctly. There were some candidates who tried to do all three brackets in one step, usually leading to few marks being awarded.

Candidates needed to be careful in copying their own work, often losing a mark when re-writing their answer out incorrectly in the next stage of their working. For example, having given x^3 in their second stage of working, ending up writing $x^2 + 6x^2 + 11x + 6$ as their final answer.

Q7. This question was well attempted by the more able students who quickly identified that it required the use of the formula. These students usually worked carefully and accurately to score full marks. Of the many students who were not successful, most either attempted to factorise the quadratic expression or they attempted other fruitless algebraic manipulation. Attempts using trial and improvement were also often seen but these were invariably unsuccessful.

Q8. Many values were given correctly in part (a). The most common error was in giving and answer of 3 or -3 for x=-1. Plotting points was quite well done in part (b); nearly all candidates realised that a curve was needed to join the points. Not all candidates knew how to answer part (c). Common errors included reading from the line y=1 or giving the solutions as coordinates rather than values. Few candidates marked the intersection with their curve to show where they were attempting to read off the values. Reading accurately was spoilt sometimes by poorly drawn curves.

Q9. This was an unusual question with the intention of testing knowledge of the quadratic formula. Many students were able to write down the value of *a* or of *b* but had to work a little harder when it came to finding the value of *c*. As when solving quadratic equations using the formula there were many students who made a sign error with *b*. Of course there where many students who thought this was an exercise in working out the value of the given expression(s). They were awarded no marks unless they explicitly identified the values of *a*, *b* and *c*.

Q10. Over 50% of candidates drew clear, accurate graphs and scored full marks in the first part of this question. Most candidates plotted two or more points which they then joined to form a straight line. Relatively few candidates constructed a table of values before plotting points. A significant minority of candidates tried to use the gradient-intercept method to draw the line. This approach proved less successful. Most candidates using this method drew lines passing through (0, 2) but with an incorrect gradient. There was little evidence to suggest that the different scales on the *x* and *y* axes had confused candidates.

In part (b)(i) nearly 60% of candidates gave a correct equation. Of those who were not successful, a few gave an expression rather than an equation. In part (b)(ii) correct answers were rare. A large number of candidates who demonstrated an understanding of the situation gave the equation of a perpendicular line rather than the gradient. This highlights the need for candidates to ensure they read the particular demands of a question carefully.

Q11. It was pleasing to see so many candidates who had a clear idea of how to tackle this question. Many knew how to find the gradient of the perpendicular bisector and most knew that the general equation of a straight line was y = mx + c.
There was some confusion in finding the coordinates of M, the midpoint of the line segment – often by finding the difference of the coordinates of A and B, rather than their means.

Q12. Many students were able to find the gradient of the line $2y = 3x - 4$ or the gradient of the line passing through the points A and B, but relatively few were able to find both of these correctly. Correct reasons were often based on examples rather than by a direct appeal to the formula $m_1 \times m^2 = -1$, eg "the gradient of the line perpendicular to $2y = 3x - 4$ has to be $-\frac{2}{3}$ not $-\frac{4}{3}$". Students should be advised to show their methods clearly, eg by quoting a suitable general formula for calculating gradients, before attempting to use it.

Q13. There were many different approaches to this question, but equally many who chose not to attempt it. A significant number substituted (−1,2) and (2,8) in turn into the equation of line A, hoping to find the point of intersection. Some tried to draw sketches of the lines, but usually these were not sufficiently accurate, and needed to be supported with additional working. Few candidates were able to work out the gradient of the line B correctly. Some appeared to that the lines would only intersect if they were perpendicular. The best solutions came from using the equation of line B as y=2x+4 and equating the y-intercept on both lines. Some compared the gradient with equal success.

Q14. In part (a) the turning point was well understood, with nearly all candidates gaining this mark.

In part (b) most candidates knew they had to read off the values at the intersection of the curve with the x-axis, but in part (c) the use of function notation confused a significant minority, who failed to give an answer; those who understood usually went on to read off from 1.5 as intended.

In both parts (b) and (c) it was the most basic of errors that lost candidates marks. This included those who misread the scale, those who failed to include negative sings when needed, and those who gave coordinates as the roots rather than the values of x.

Q15. This was a challenging question that was attempted by most candidates but poorly done by many. Those who drew guide lines from the correct centre often got full marks. Many of the incorrect responses were due to candidates using the wrong scale factor (often ½) or using the wrong centre of enlargement.

Q16. This question was answered well by about a quarter of students, though a good proportion of these students missed the units of time from the x axis on their diagram. Though diagrams were attempted by nearly all students many of them used height rather than area to represent frequencies.

Q17. It was essential in part (a) that candidates made it clear which lengths they were attempting to calculate. Some correct solutions were seen but the majority of candidates were unable to make a start on this question.

Common errors included the belief that the height of a sloping face was also 10 cm, or that their correct calculation to find the height of the sloping face meant that they had found the height of the pyramid, that the diagonal of the base was 10 cm and that base angles on the sloping faces were 45°. Some candidates who did successfully find the height of the pyramid then went on to use the wrong formula for the volume. Using ½ × base area × height or introducing π were common errors.

Many candidates were successful in part (b) without showing any working and having failed to give an answer in part (a).

Q18. It was pleasing to see so many candidates who had a clear idea of how to tackle this question. Many knew how to find the gradient of the perpendicular bisector and most knew that the general equation of a straight line was y = mx + c.
There was some confusion in finding the coordinates of M, the midpoint of the line segment – often by finding the difference of the coordinates of A and B, rather than their means.

Q19. 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.

Q20. Those students with some idea about completing the square were often able to score one mark for $(x + 3)^2$ but errors were frequently made with the '− 16'.

Q21. Only a handful of candidates scored any marks in part (a) with $x - 0.25$ being a common incorrect response for those making any algebraic attempt. By contrast, part (b) was well answered with many correct responses. A few candidates reached 80 as they divided 240 by 3 (win, lose, draw) and a few wrote ¼ × 240 or 240 ÷ 4 but then failed to get to 60.

Q22. This probability question without replacement was recognised as such by most of the candidates, although a surprising number did give a denominator of 121, showing that they thought one of the sandwiches was replaced before the second one was taken. An answer of $^{76}/_{121}$ was awarded 2 marks for the work in dealing correctly with the numerator.

If candidates were able to correctly show a denominator of 10 on a tree diagram or use it as part of a second probability then 1 mark was earned and some candidates earned this 1 mark.

A second mark was earned by candidates who could write the probability of one combination of correct probabilities as a product and a further mark was gained if those, or at least three of them, were shown to be added.

The fourth method mark was awarded if all six combinations were added or if they were working from 1 − probability of both of the same types taken. Fully correct answers were given by only a small number of candidates.

Q23. Most students did not understand the concept of a bound, so scored no marks for either part of this question. Those that did get the mark for part (a), often did have some strategy for dealing with the formula. However, very few appreciated that the upper bound of $\frac{1}{q}$ is found from using the lower bound of q. These students generally scored 1 mark for the 4.35. As often is the case, students also thought that bounds had to be applied to an exact answer, so worked out $4.3 + \frac{1}{0.4}$ and then added 0.5 to their answer

Q24. Candidates who had some idea of how to find the vectors $\overrightarrow{MN}$ and $\overrightarrow{AB}$ in terms of **m** and **n**, generally scored at least two of the three marks. The third mark was to give a reason based on the forms for $\overrightarrow{MN}$ and $\overrightarrow{AB}$ of why the two lines are parallel. Generally candidates earned the final mark by stating that 2**n** – 2**m** was a multiple of **n** – **m**. In general, notation was poor, with arrows above vectors rarely shown and with underling of **m** and **n** usually absent. Some candidates did not read the information carefully enough and found that $\overrightarrow{MN}$ and $\overrightarrow{AB}$ were half the values given in the answer. These candidates could score a maximum of two marks.

Q25. This question involved multiplying out the brackets, rationalising, and simplifying the surds. Many failed to expand the brackets correctly. Those who multiplied numerator and denominator by $\sqrt{31}$ too early ended up with every term having a $\sqrt{31}$ attached. Many candidates were unable to simplify their answers; some thought that $31\sqrt{\frac{31}{31}}$ could not be simplified any further.

Q1.

Question		Working	Answer	Mark	Notes
			$\frac{x+10+x+x-4}{3}$	3	M1 for $x+10$ or $x-4$ M1 for $x+10+x+x-4$ A1 for $\frac{x+10+x+x-4}{3}$ oe

Q2.

5MB3H/01 June 2015				
Question	Working	Answer	Mark	Notes
		6.2	5	M1 for a method to find an angle $RAB = 70$, $ABR = 50$, $BRA = 60$ or $TAR = 20$ M1 for substitution into sine formula $\frac{AR}{\sin\text{"}50\text{"}} = \frac{12}{\sin\text{"}60\text{"}}$ M1 for use of sine rule to find AR, $AR = \frac{12}{\sin\text{"}60\text{"}} \times \sin\text{"}50\text{"}$ (=10.61) M1 for substitution into cosine formula $TR^2 = 5^2 + \text{"}10.61\text{"}^2 - 2 \times 5 \times \text{"}10.61\text{"} \times \cos 20$ (=37.92) A1 for 6.15 - 6.2

Q3.

Question		Working	Answer	Mark	Notes
	(a)	½ × 9.2 × 14.6 × sin 64	60.4	2	M1 ½ × 9.2 × 14.6 × sin 64 A1 60.3 – 60.4
	(b)	$AB^2 = 9.2^2 + 14.6^2 - 2 \times 9.2 \times 14.6 \times \cos 64$ $AB^2 = 297.8 - 268.64 \cos 64° = 297.8 - 268.64 \times 0.43837..$ $AB^2 = 297.8 - 117.76..$ $AB^2 = 180.03$ $AB = \sqrt{180.03}$	13.4	3	M1 $9.2^2 + 14.6^2 - 2 \times 9.2 \times 14.6 \times \cos 64°$ M1 (dep) for correct order of evaluation e.g. 297.(8) – 117.(7..) A1 13.4 – 13.42

Q4.

PAPER: 1MA0_1H					
Question		Working	Answer	Mark	Notes
	(a)		correct graph	2	M1 for 5 or 6 or 7 points plotted correctly at the ends of the intervals (overlay) A1 cao for correct graph with points joined by curve or straight line segments [SC: B1 if the shape of the graph is correct and 5 or 6 or 7 of their points are **not** at the ends but are plotted consistently within (10,20) (20,30) (30,40) etc.]
	(b)		No with supporting figures	2	M1 for 0.1 × 200 (=20) **or** 0.9×200 (=180) **or** sight of 180 used on cf axis **or** 200 – 186 (=14) A1 ft for correct decision with 20 and "9" **or** 20 and 14 **or** "age" from reading graph at 180 **OR** M1 for method to find percentage of workers who are over 65, eg $\frac{200-\text{"}191\text{"}}{200} \times 100$ (=4.5%) **or** method to find percentage of workers who are over 60 (from table), eg $\frac{200-186}{200} \times 100$ (=7%) or $\frac{200-190}{200} \times 100$ (=5%) A1 ft for correct decision with "4.5"% or 7% or 5%

Q5.

Question	Working	Answer	Mark	Notes
(a)		x_1=-2.64	M1	for substitution of −2.5 into the equation (to get x_1= −2.64)
		x_2= -2.57392	M1	for substitution of "x_1= −2.64" and "x_2= −2.57392" to give x_2 and x_3
		x_3=-2.603767255	A1	for x_1= −2.64 oe, x_2= −2.57(392) and x_3= −2.6(03767255) Condone x_3= −2.61 if x_2= −2.57 is used in the substitution
(b)		Statements	C1	Connection between equation and iterative form in (a) e.g. rearrangement
			C1	Statement e.g. iteration is an estimation of a solution

Q6.

Question	Working	Answer	Mark	Notes
		$x^3+6x^2+11x+6$	M1	for method to find the product of any two linear expressions (3 correct terms) e.g. $x^2+x+2x+2$ or $x^2+2x+3x+6$ or $x^2+x+3x+3$
			M1	for method of multiplying out remaining products, half of which are correct (ft their first product) e.g. $x^3+x^2+2x^2+3x^2+2x+3x+6x+6$
			A1	cao

Q7.

PAPER: 5MB3H_01					
Question		Working	Answer	Mark	Notes
			−2.87, 0.87	3	M1 for substitution into formula; allow sign errors in b and c M1 for reduction to $\frac{-4-\sqrt{56}}{4}$ or $\frac{-4+\sqrt{56}}{4}$ A1 for 0.87 to 0.88 and −2.87 to −2.88 OR M1 for $(x+1)^2$ M1 for reduction to $\sqrt{\frac{7}{2}}-1$ or $-\sqrt{\frac{7}{2}}-1$ A1 for 0.87 to 0.88 and −2.87 to −2.88

Q8.

Question		Working	Answer	Mark	Notes
	(a)	(−2,7), (−1,1), (0,−1), (1,1), (2,7)	1, −1, 7	2	B2 all 3 correct (B1 for 1 or 2 correct) OR M1 for attempt to plot x^2 M1 for attempt to draw x^2
	(b)		Curve drawn	2	M1 at least 4 points plotted from their table; all points ±1 small square A1 cao for correct curve drawn OR M1 for curve $2x^2$ seen, or parabolic curve drawn through (0,−1) A1 cao for correct curve drawn
	(c)		0.6 to 0.8 −0.6 to −0.8	2	M1 for identification of intersection of their curve with x axis, or one solution stated A1 for both solutions. Accept solutions as 0.6 to 0.8 or −0.6 to −0.8 OR ft from any drawn curve crossing the x-axis (±½ square)

Q9.

Question		Working	Answer	Mark	Notes
			$2x^2 + 7x + 4 = 0$	3	M1 for finding a correct coefficient M1 for a method to find a and c or b and c A1 $2x^2 + 7x + 4 = 0$ or $a = 2$, $b = 7$, $c = 4$

Q10.

Question	Working	Answer	Mark	Notes
(a)	Table of values x = -1 0 1 2 3 y = 2 2 6 10 14 OR Using $y = mx + c$, gradient = 4, y intercept = 2	Line from (1, 2) to (3,14)	3	**(Table of values)** M1 for at least 2 correct attempts to find points by substituting values of x. M1 ft for plotting at least 2 of their points (any points plotted from their table must be correct) A1 for correct line between 1 and 3 **(No table of values)** M2 for at least 2 correct points (and no incorrect points) plotted OR line segment of $y = 4x + 2$ drawn (ignore any additional incorrect segments) (M1 for at least 3 correct points with no more than 2 incorrect points) A1 for correct line between -1 and 3 **(Use of $y = mx + c$)** M2 for at least 2 correct points (and no incorrect points) plotted OR line segment of $y = 4x + 2$ drawn (ignore any additional incorrect segments) (M1 for line drawn with gradient 4 OR line drawn with a y intercept of 2) A1 for correct line between 1 and 3
(b)(i)		$y = 4x + c$, $c \neq 2$	1	B1 Correct equation given.
(ii)		– 0.25	1	B1 Correct gradient given. Note – 0.25 could be written as -¼ oe

Q11.

5MB2H/01 June 2015				
Question	Working	Answer	Mark	Notes
		$y = 2x - 1$	4	M1 for $\left(\frac{6+-2}{2}, \frac{1+5}{2}\right)$ oe M1 for $\frac{-1}{-0.5}$ oe (=2) M1(dep on previous M1) for using y = '2'$x + c$ with their coordinates for the midpoint used correctly to find c A1 for $y = 2x - 1$ oe

Q12.

PAPER: 1MA0_1H					
Question		Working	Answer	Mark	Notes
*		$2y = 3x - 4$ $y = \frac{3}{2}x - 2$; $m = \frac{3}{2}$ $\frac{3--1}{1-4} = -\frac{4}{3}$ $\frac{3}{2} \times -\frac{4}{3} = -2$	No with reason	4	M1 for $\frac{3}{2}$ oe or $y = \frac{3}{2}x\left(-\frac{4}{2}\right)$ oe M1 for method to find gradient of AB, eg $\frac{3--1}{1-4}$ **or** $\frac{-1-3}{4-1}$ **or** $-\frac{4}{3}$ oe A1 for identifying gradients as $\frac{3}{2}$ oe **and** $-\frac{4}{3}$ oe C1 (dep on M1) for a conclusion with a correct reason, eg No as product of $\frac{3}{2}$ and $-\frac{4}{3}$ is not −1, ft from their two gradients

Q13.

PAPER: 1MA0_2H				
Question	Working	Answer	Mark	Notes
*		Yes with explanation	3	M1 For **Line A**: writes equation as $y = 1.5x + 4$ or gives the gradient as 1.5 or constant term of 4 OR for **Line B**: shows a method which could lead to finding the gradient or gives the gradient as 2 or constant term of 4 or calculates a sequence of points including (0,4) or writes equation of line as $y = 2x + 4$ M1 Shows correct aspects relating to an aspect of Line A and an aspect of Line B that enables some comparison to be made eg gradients, equations or points. C1 for gradients 1.5 **and** 2 **and** Yes **with** explanation that the gradients are different or states the lines intersect at (0,4) or explanation that interprets common constant term (4) from equations OR M1 for a diagram that shows both lines drawn and intersecting at (0,4) M1 for a diagram that shows both lines and their intersection point identified as (0,4) C1 for Yes and states the intersection point as (0,4)

Q14.

Question	Working	Answer	Mark	Notes
(a)		1, −3	B1	cao
(b)		−0.75, 2.75	B1	accept −0.7 to −0.8, 2.7 to 2.8
(c)		−2.8	B1	cao

Q15.

PAPER: 1MA0_1H					
Question		Working	Answer	Mark	Notes
			Triangle with vertices at (−1,−4), (−1,−5), (−3,−4.5)	2	M1 for correct shape and size and the correct orientation in the wrong position or two vertices correct A1 cao

Q16.

5MB1H_01 November 2015					
Question		Working	Answer	Mark	Notes
		Frequency densities of $8 \div 10 = 0.8$ $16 \div 10 = 1.6$ $15 \div 5 = 3$ $12 \div 5 = 2.4$ $6 \div 20 = 0.3$	Fully labelled histogram	3	B3 for fully correct histogram (B2 for 4 correct blocks) (B1 for 3 correct blocks) (If B0 then SC B1 for correct key eg $1cm^2$=2 birds or frequency ÷ class interval for at least 3 frequencies) NB apply the same mark scheme if a different frequency density is used

Q17.

Question		Working	Answer	Mark	Notes
	(a)	Let O be the centre of the base. $OB^2 + OC^2 = 10^2$; $OB^2 = 50$ $AO^2 = AB^2 - OB^2 = 50$ Vol = $\frac{1}{3} \times 10^2 \times \sqrt{50}$ **OR** Let M be the midpt of side BC and let O be the centre of the base. $AM^2+MC^2 = 10^2$; $AM^2 = 75$ $AO^2 = AM^2 - MO^2 = 50$ Vol = $\frac{1}{3} \times 10^2 \times \sqrt{50}$	236	4	M1 correct method to start to find BD or BO using triangle OBC or triangle BCD (oe) Eg. $OB^2 + OC^2 = 10^2$ **or** BO **^{2} =** 50 **or** $BO = \sqrt{50}$ (=7.07..) **or** $BO = \frac{\sqrt{200}}{2}$ **or** $10^2 + 10^2 = BD^2$ **or** $BD^2 = 200$ **or** $BD=\sqrt{200}$ (=14.1..) M1 (dep) correct method to find height of pyramid using triangle AOB Eg. $AO^2 = 10^2 -$'$\sqrt{50}$'^{2} **or** AO^2 = 50 **or** $AO = \sqrt{50}$ (=7.07..) M1 (indep) $\frac{1}{3} \times 10^2$ '$\sqrt{50}$' (but **not** $\frac{1}{3} \times 10^2 \times 10$) A1 235 – 236 **OR** M1 correct method to start to find height of a face using triangle AMC (oe) Eg. $AM^2 + 5^2 = 10^2$ **or** $AM^2 = 75$ **or** $AM = \sqrt{75}$ (=8.66...) M1 (dep) correct method to find height of pyramid using triangle AOM Eg. AO^2 = '$\sqrt{75}$'$^2 - 5^2$ **or** AO^2 = 50 **or** $AO = \sqrt{50}$ (=7.07..) M1 (indep) $\frac{1}{3} \times 10^2 \times$'$\sqrt{50}$'(but **not** $\frac{1}{3} \times 10^2 \times 10$) A1 235 – 236 **OR** M1 for sin 45 = $x/10$ **or** cos 45 = $x/10$ M1 for h = 10 × sin 45 **or** h = 10 × cos 45 (=7.07..) M1 (indep) $\frac{1}{3} \times 10^2 \times$'7.07...' (but **not** $\frac{1}{3} \times 10^2 \times 10$) A1 235 – 236
	(b)	Angle ABO = 45° Angle DAB = 180 – 45 – 45 **OR** In ΔBAD, cos A = $\frac{10^2+10^2-\text{'}\sqrt{200}\text{'}^2}{2\times10\times10} = 0$ **OR** In ΔBOA, cos B= $\frac{\text{'}\sqrt{50}\text{'}}{10}$ Angle BAD = 180 – '45' – '45' **OR** sin A = $\frac{\text{'}\sqrt{50}\text{'}}{10}$ A = 45 Angle BAD = 2 × '45'	90	2	M1 Angle DAB = 180 – 2× '45' A1 89.98 – 90 **OR** M1 cos BAD = $\frac{10^2+10^2-\text{'}\sqrt{200}\text{'}^2}{2\times10\times10}$ A1 89.98 – 90 **OR** M1 sin A = $\frac{\text{'}\sqrt{50}\text{'}}{10}$ A1 89.98 - 90

Q18.

5MB2H/01 June 2015				
Question	Working	Answer	Mark	Notes
		$y = 2x - 1$	4	M1 for $\left(\frac{6+-2}{2}, \frac{1+5}{2}\right)$ oe M1 for $\frac{-1}{-0.5}$ oe (=2) M1(dep on previous M1) for using $y =$ '2'$x + c$ with their coordinates for the midpoint used correctly to find c A1 for $y = 2x - 1$ oe

Q19.

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

Q20.

Question	Working	Answer	Mark	Notes
13		$(x + 3)^2 - 16$	M1 A1	for $(x + 3)^2$ or $(x^2 + 6x - 7 =)\ x^2 + 2ax + a^2 + b$ cao

Q21.

PAPER: 5MB1F_01					
Question		Working	Answer	Mark	Notes
	(a)		$0.75 - x$	2	M1 for $1 - 0.25 + x$ or $0.25 + x$ A1 or $0.75 - x$ oe
	(b)		60	2	M1 for 0.25×240 oe A1 cao

Q22.

		Working	Answer	Mark	Notes
		EE + CC + HH **Or** EC+EH+CE+CH+HE+HC **Or** E,not E+ C,not C + H,not H	$^{76}/_{110}$	5	M1 for use of 10 as denominator for 2nd probability M1 for $^4/_{11} \times {}^3/_{10}$ *or* $^5/_{11} \times {}^4/_{10}$ *or* $^2/_{11} \times {}^1/_{10}$ M1 for $^4/_{11} \times {}^3/_{10} + {}^5/_{11} \times {}^4/_{10} + {}^2/_{11} \times {}^1/_{10}$ $\left(= \frac{34}{110}\right)$ M1 (dep on previous M1 for 1 – '^{34}'$/_{110}$ A1 for $^{76}/_{110}$ oe **Or** M1 for use of 10 as denominator for 2nd probability M1 for $^4/_{11} \times {}^5/_{10}$ or $^4/_{11} \times {}^2/_{10}$ or $^5/_{11} \times {}^4/_{10}$ or $^5/_{11} \times {}^2/_{10}$ or $^2/_{11} \times {}^4/_{10}$ or $^2/_{11} \times {}^5/_{10}$ M2 for $^4/_{11} \times {}^5/_{10} + {}^4/_{11} \times {}^2/_{10} + {}^5/_{11} \times {}^4/_{10} + {}^5/_{11} \times {}^2/_{10} + {}^2/_{11} \times {}^4/_{10} + {}^2/_{11} \times {}^5/_{10}$ (M1 for at least 3 of these) A1 for $^{76}/_{110}$ oe **Or** M1 for use of 10 as denominator for 2nd probability M1 for $^4/_{11} \times {}^7/_{10}$ *or* $^5/_{11} \times {}^6/_{10}$ *or* $^2/_{11} \times {}^9/_{10}$ M2 for $^4/_{11} \times {}^7/_{10} + {}^5/_{11} \times {}^6/_{10} + {}^2/_{11} \times {}^9/_{10}$ (M1 for two of these added) A1 for $^{76}/_{110}$ oe **PTO for SC's** **SC:** B2 for $^{76}/_{121}$ **SC:** B1 for $^4/_{11} \times {}^4/_{11} + {}^5/_{11} \times {}^5/_{11} + {}^2/_{11} \times {}^2/_{11}$ (= $^{45}/_{121}$) **Or** $^4/_{11} \times {}^5/_{11} + {}^4/_{11} \times {}^2/_{11} + {}^5/_{11} \times {}^4/_{11} + {}^5/_{11} \times {}^2/_{11} + {}^2/_{11} \times {}^4/_{11} + {}^2/_{11} \times {}^5/_{11}$ **Or** $^4/_{11} \times {}^7/_{11} + {}^5/_{11} \times {}^6/_{11} + {}^2/_{11} \times {}^9/_{11}$

Q23.

Question		Working	Answer	Mark	Notes
	(a)		4.25	1	B1 cao
	(b)		7.20-7.21	3	B1 4.35 or 0.35 M1 for $4.35 + \frac{1}{0.35}$ A1 7.2(0)-7.21 or $\frac{1009}{140}$ from a correct method seen

Q24.

PAPER: 1MA0_1H					
Question		Working	Answer	Mark	Notes
*			Proof	3	M1 for $\overrightarrow{MN} = \overrightarrow{MO} + \overrightarrow{ON}$ (= $\mathbf{n} - \mathbf{m}$) or $\overrightarrow{NM} = \overrightarrow{OM} + \overrightarrow{NO}$ (= $\mathbf{m} - \mathbf{n}$) or $\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB}$ (= $2\mathbf{n} - 2\mathbf{m}$) or $\overrightarrow{BA} = \overrightarrow{OA} + \overrightarrow{BO}$ (= $2\mathbf{m} - 2\mathbf{n}$) M1 for $\overrightarrow{MN} = \mathbf{n} - \mathbf{m}$ and $\overrightarrow{AB} = 2\mathbf{n} - 2\mathbf{m}$ oe C1 (dep on M1, M1) for fully correct proof, with $\overrightarrow{AB} = 2\overrightarrow{MN}$ or $\overrightarrow{AB}$ is a multiple of $\overrightarrow{MN}$ [SC M1 for $\overrightarrow{MN} = 0.5\mathbf{n} - 0.5\mathbf{m}$ and $\overrightarrow{AB} = \mathbf{n} - \mathbf{m}$ C1 (dep on M1) for fully correct proof, with $\overrightarrow{AB} = 2\overrightarrow{MN}$ or $\overrightarrow{AB}$ is a multiple of of $\overrightarrow{MN}$]

Q25.

Question		Working	Answer	Mark	Notes
		$6 \times 6 + 6 \times \sqrt{5} - 6 \times \sqrt{5} - \sqrt{5} \times \sqrt{5}$ $\frac{31}{\sqrt{31}} \times \frac{\sqrt{31}}{\sqrt{31}}$	$\sqrt{31}$	3	$6 \times 6 + 6 \times \sqrt{5} - 6 \times \sqrt{5} - \sqrt{5}$ or $6^2 - \left(\sqrt{5}\right)^2$ (for 3 out of not more than 4 terms including signs or 4 terms correct ignoring signs) M1 $\frac{"31"}{\sqrt{31}} \times \frac{\sqrt{31}}{\sqrt{31}}$ or for $\frac{\text{[expression in surd form]}}{\sqrt{31}} \times \frac{\sqrt{31}}{\sqrt{31}}$ A1 cao