BUMPER "BETWEEN PAPERS" PRACTICE

SUITABLE FOR HIGHER TIER ONLY

Summer 2019

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. The majority of candidates who realised that they had to use ½ *ab* sin *C* for the area of the triangle often substituted the given lengths and angle correctly but then could not progress any further. Some good fully correct proofs were seen but a very few candidates were unable to gain full marks because their calculators were clearly set in radian or gradian rather than degree mode.

Q2. Many candidates tried to use the quadratic equation formula and often they obtained full marks. Some did not substitute correctly. Common errors were omitting the +/– and the division line being too short. Some candidates started with 6 rather than –6 and some used $c = 2$ instead of $c = –2$. Errors were also made after a correct substitution as many candidates could not evaluate the discriminant as 76. By using a calculator candidates might have avoided this problem. A number of candidates missed the clue about giving solutions correct to 2 decimal places and tried to solve the equation by factorising. A significant minority tried to use algebraic methods of operations to both sides. A small minority started to use a trial and improvement method which at the very best would only lead them towards one solution.

Q3. No Examiner's Report available for this question

Q4. Seeing the correct bounds was rare and 225.5 and 175.5 or 230 and 180 were often seen as the upper bounds of *BA* and *BC* respectively. Many students however earned the first mark for a correct upper bound for the angle.

Use of ½*absinC* was good, however it was not uncommon to see the students' upper bounds for *BA* and BC and then sin 50° used.

Q5. In this question many students realised that they needed a common denominator and this mark was often scored. Few students gained all three marks as the negative sign in front of the second fraction caused problems for many students.

Q6. There were some who did not understand the topic and associated this question with Pythagoras and right-angled trigonometry. The majority deduced Cosine rule was needed and correctly substituted in their values. In many cases the order of operations in Cosine Rule was flawed, resulting in an incorrect length for DB. Many then went on to use Sine Rule, with greater success and sound method shown resulted in additional marks.

Q7. No Examiner's Report available for this question

Q8. This question was not well answered with few students getting this fully correct. Many scored 1 mark for either finding the length of one of the two missing sides or, more commonly, finding the area of a rectangle. A few managed to get the correct simplified expression for the area but nearly all of these students lost the final mark as they left their answer as an expression and not a formula.

Q9. Very few candidates attempted to solve this problem algebraically, the majority employing trial and improvement methods. Some used a ratio approach which was usually fully correct. Some candidates found the correct costs without showing a clear method but could gain full credit if they showed clearly that their total cost of the 8 purses and 9 key rings was £40

The most common error, scoring no marks, was to divide £40 in the ration 1 : 2 and then find their costs by dividing the two parts by 8 and 9 for the cost of a purse and key ring respectively. This led to answers where the price of a purse was not double the price of a key-ring.

Q10. In part (a) most used the formula for the area of a trapezium and gained the first mark for this; the second mark was more difficult to achieve as the processes used were either incomplete or unconvincing. In part (b) a surprising number of candidates made no attempt to use the quadratic formula to find the value of *x*. Of those who did, most were able to substitute the correct values into the formula and many were able to complete the process leading to the correct answer. A few candidates lost the accuracy mark by suggesting a negative value was acceptable for the value of *x*. In some cases answers to the two parts were mixed up or poorly organised. Resorting to trial and improvement did not always help.

Q11. No Examiner's Report available for this question

Q12. This question was well attempted by students but only the most able were gaining full marks and even able students were missing the inverse in the question and writing y α $y \alpha x^2$ or $y = kx^2$ whilst others missed the squared and wrote y $\alpha \frac{1}{x}$ or y = $\frac{k}{x}$. Some of the better students having found k = 375 then stopped so only gained two marks.

Q13. No Examiner's Report available for this question

Q14. In part (a), few candidates realised that they needed to find the total number of seconds for both the morning customers and the afternoon customers. Most thought that all they had to do was simply calculate the average of 48.7 and 50.2. Other popular incorrect methods were 50.2 – 48.7 and $^{6275}/_{75}$.

Part (b) was generally done well. Most candidates were able to draw an accurate box plot for the given information. Common incorrect answers were generally based on misinterpretations of the scale on the seconds axis. Freehand diagrams were often messy and difficult for examiners to mark. Candidates should be advised to use a ruler when drawing box plots.

Q15. Many candidates started off by using the Cosine Rule with the angle 136 or basic trigonometry, but alone this would not have led to a complete solution. It was rare to find Cosine Rule being used correctly as a first stage. In some cases a start using the Sine Rule was not developed, as a significant number of candidates did not know what to do with it once they had substituted the numbers. Those who did so successfully usually went on to use Cosine Rule or Sine Rule again to complete the solution. Premature rounding spoilt many solutions.

Q16. No Examiner's Report available for this question

Q17. Factorisation of a quadratic function with non-unitary coefficient of x^2 was poor. Many chose to employ the formula to solve the given equation. Any mistake in the use of the formula, which was more often than not, resulted in no marks. A fully correct solution by this method gained just one of the three available marks. Many did make good attempts at factorising but then failed to complete the solution. A common incorrect attempt at factorisation was $(4x-9)(2x+3)$.

Q18. Many students were able to make a reasonable effort at removing the fraction for one mark but very few were able to carry the algebraic solution any further. Some did get the correct quadratic but could go no further and some never quite got the quadratic, writing, for example $x^2 + 3x = 4$.

Q19. The value of k required in this question involving an iterative process was 0.98 "98%" was not an acceptable answer. Some students did more than was expected and used the iterative process to calculate the value of V_1.

Q20. No Examiner's Report available for this question

Q21. No Examiner's Report available for this question

Q22. There were some excellent solutions to this question showing an accurately constructed circle followed by the plotting of a suitable line and accurate reading off of the solutions of the simultaneous equations. Students who did not see the connection between parts (a) an (b) often began a solution using substitution but they rarely completed the question successfully. They struggled to manipulate the equations correctly. A small but significant group of students found the values of x but lost a mark because they did not find the corresponding values of y.

Q23. No Examiner's Report available for this question

Q24. No Examiner's Report available for this question

Q25. No Examiner's Report available for this question

Q26. No Examiner's Report available for this question

Q27. No Examiner's Report available for this question

Q28. In part (a), candidates appeared to find this question challenging. Some scripts were blank and many had the answer of 12 but it clearly came from incorrect working usually, the calculation 47 – 35 (greatest time – upper quartile), and so scored no marks.

Some candidates calculated 75% of 48 to give 36 but then failed to subtract this from 48.

The majority of candidates attempted the box plot and usually scored full marks for part (b). The most common error was plotting 48 not 47 or omitting the median.

In part (c) many candidates concluded that journey times were longer on Tuesday than they were on Monday or that the median time was higher. However comparison of range or interquartile range was less common. Unfortunately many just listed times for Monday and times for Tuesday without making any comparison. One mark was often awarded for a correct comparison and the second mark not awarded as no context was offered for these comparisons.

Q29. Most candidates scored either 1 mark (for *AB* = 5 cm), or full marks for finding the length of *AD* correctly. It was very common to see the sine rule being used in the right angled triangle *ABD*, sometimes involving the right angle and sometimes the 54°. A few candidates used tan and Pythagoras in triangle *ABD*. Providing all the steps involved were logically correct, they were awarded the two method marks. Often this approach led to an answer outside the acceptable range, due to accumulation of rounding errors.

Q30. Many students were awarded at least one mark for getting at least one frequency correct in part (a) of this question. Considerably fewer students got all of the frequencies correct. A commonly seen set of frequencies was "9, 16, 10, 8". For their answers to part (b) of the question, many students correctly calculated the number of people in the sample who had a salary greater than £40000 but not all of them expressed this as a fraction or percentage of the total number of people in the sample. For part (c), when trying to estimate the median salary, there was evidence that many students just calculated $\frac{0+50000}{2}$. Other students got as far as identifying that the median would be the $\frac{n+1}{2}$th salary but could not make any further progress in estimating this salary.

Q31. This question proved to be a good test of algebraic techniques including the use of brackets, expansion of brackets and working with negative signs. The most common approach involved attempting to subtract the area of the triangle from the area of the rectangle; here the use of brackets and negative signs was poor. The final mark for the quality of written communication could only be awarded if the candidate had clearly shown, with fully correct algebra, that the shaded area is $18x - 30$. Some candidates arrived at an answer of $18x - 30$ with working that was unclear or incorrect.

Q32. Many candidates gained the first mark by either calculating areas through use of the dimensions, or counting squares. Those using column heights scored no marks.

Most understood the need to find 25% of their total. How to use this to answer the question eluded most.

Q33. Both parts seemed to be beyond many students entered for this exam. Part (a) was a test of knowledge of circle theorems. Students could answer by using the classical 'The angle in a semi circle is a right angle' but reference to the alternate segment theorem was also accepted.
In part (b) students were expected to use sine to find the opposite, then double to get the diameter followed by using cosine to get the required length. Many students clearly had no knowledge of trigonometry so scored no marks. Others showed confusion between sine, cosine and tangent and also generally scored no marks. Some lost a mark because of premature approximation – they truncated 8 sin35° to 4, so their diameter was 8 and 8cos70° was outside the allowed tolerance. This also tended to happen for those who used a combination of cosine and Pythagoras's Theorem in triangle *ABO* and a combination of sine and Pythagoras's Theorem in triangle *DBC*, although they could earn the three method marks.

Q34. Almost 70% of candidates gained some marks for their responses to this question. Most of these candidates were successful in finding the size of the angle, but fully correct reasons were rare.

Few candidates seemed able to express 2 reasons with sufficient clarity for examiners to award the communication mark available. For example, statements such as "the angle between the tangent and the circle is 90º" are not acceptable. Here a statement equivalent to "the tangent to a circle is perpendicular (90º) to the radius" is required. A common error was for candidates to mistakenly use "angle at the centre is twice the angle at the circumference" and give the answer "84º".

Q35. No Examiner's Report available for this question

Q36. Some students scored one mark for *AB* = b – a or *BA* = a – b but few were able to make any further meaningful progress. Those that did were most likely to find a correct expression for *MN*. Few students wrote that *AP* = *k*(b – a) which meant that correct expressions for *MP* and *PN* were rare. Mistakes were sometimes made with the direction signs of the vectors.

Q37.No Examiner's Report available for this question

Q38. No Examiner's Report available for this question

Mark Scheme

Q1.

Question		Working	Answer	Mark	Notes
		A = ½ ×x× 2x sin30° A =½ ×2x^2×0.5 **OR** Height = 2$x$sin 30° = x $A=\frac{x\times x}{2}=\frac{x^2}{2}$ **OR** Height = x sin 30 = $x/2$ A = ½ ×2x× $x/2$= $x^2/2$	$x=\sqrt{2A}$ shown	3	M1 (A =) ½ ×x× 2x sin30° A1 $A = x^2 \times 0.5$ **or** $A = x^2/2$ C1 for completion with all steps shown **OR** M1 height = 2$x$sin 30 (= x) A1 $A = x^2\times0.5$ **or** $A = x^2/2$ C1 for completion with all steps shown **OR** M1 for height = x sin 30 (= $x/2$) A1 $A = x^2 \times 0.5$ **or** $A = x^2/2$ C1 for completion with all steps shown

Q2.

		Working	Answer	Mark	Notes
			0.27 and –1.47	3	M1 for $\frac{-6\pm\sqrt{6^2-4\times5\times-2}}{2\times5}$, allow substitution of 2 or –2 for c M1 for $\frac{-6\pm\sqrt{76}}{10}$ A1 for 0.27(17797...) and –1.47(17797...)

Q3.

Question	Working	Answer	Mark	Notes
(a)(i)		Box plot drawn	B1	for a box drawn with at least two correct values from: LQ = 23, Median = 28, UQ = 32.5
			B1	for lowest value = 17 and highest value = 41 clearly shown on the grid
			B1	for a fully correct diagram
(a)(ii)		$\frac{10}{25}$	M1	for $\frac{a}{25}$ where $a < 25$ or $\frac{10}{b}$ where $10 < b \leq 25$
			A1	for $\frac{10}{25}$ oe
(b)		Incorrect classes	C1	for identifying that the class intervals are incorrect, e.g. should be $0 < a \leq 30$, 40, 50

Q4.

Paper: 5MB3H_01					
Question		Working	Answer	Mark	Notes
			15500 to 15600	3	B1 for 50.5 (accept $50.4\dot{9}$) or 227.5 (accept $227.4\dot{9}$) or 177.5 (accept $177.4\dot{9}$) M1 for 0.5 × "227.5" × "177.5" ×sin"50.5" A1 for an answer in the range 15575 to 15580 from using three **correct** upper bounds

Q5.

PAPER: 5MB2H_01					
Question		Working	Answer	Mark	Notes
			$\frac{7x-6}{x(2-x)}$	3	M1 for intention to use $x(2-x)$ as the denominator M1 for $\frac{4x-3(2-x)}{x(2-x)}$ oe A1 cao allow $2x-x^2$ as a denominator

Q6.

Question		Working	Answer	Mark	Notes
		$DB^2 = 5.6^2 + 8.2^2 - 2 \times 5.6 \times 8.2\cos 78$ $DB^2 = 79.505\ldots$ $DB = 8.9165795..$ $\frac{8.9165..}{\sin 80} = \frac{DC}{\sin 40}$ $DC = \frac{8.9165.. \times \sin 40}{\sin 80}$ $=8.9165.. \times 0.6572..$ $=5.8198$	5.82	6	M1 Cosine rule: $DB^2=5.6^2+8.2^2-2\times5.6\times8.2\times\cos78$ M1 $\sqrt{79.505\ldots}$ (=8.9165795..) A1 for DB = 8.90 to 8.92 M1 $\frac{\text{"8.9165.."}}{\sin 80} = \frac{DC}{\sin 40}$ M1 $\frac{\text{"8.9165.."} \times \sin 40}{\sin 80}$ (=5.8198) A1 for answer 5.80 to 5.83 If working in RAD or GRAD award method marks only. RAD: DB=13.318.., DC=-9.98.. GRAD: DB=8.2152…, DC=5.0773…

Q7.

Question		Working	Answer	Mark	Notes
			$\frac{103}{165}$	3	M1 for method to find 2 multiples of 0.624 that can be used to eliminate the decimals M1 for complete method A1 cao

Q8.

5MB2H_01 November 2015					
Question		Working	Answer	Mark	Notes
			$A = 9x^2 + 19x - 6$	4	B1 for one of $5x-2$ or x found M1 for correct method to find area of one relevant rectangle. M1 for complete method to find whole area or simplified expression $9x^2 + 19x - 6$ or correct but not simplified formula A1 for correct, simplified formula $A = 9x^2 + 19x - 6$

Q9.

PAPER: 5MB3H_01				
Question	Working	Answer	Mark	Notes
*	Key ring: $1.6 \times 9 = 14.4$ Purse: $3.2 \times 8 = 25.6$	Key ring £1.60 Purse £3.20	4	M1 for $9x$ or $8 \times 2x$ (where x is the price of a key ring) M1 for equation $9x + 8 \times 2x = 40$ oe A1 for 1.6 and 3.2 C1 (dep on M2) for both "£1.60" and "£3.20" clearly identified for correct items with correct money notation OR M1 for $(8\times2) : 9$ $(= 16 : 9)$ M1 for $40 \div (16 + 9)$ A1 for 1.6 and 3.2 C1 (dep on M2) for both "£1.60" and "£3.20" clearly identified for correct items with correct money notation OR M2 for trial with attempt to evaluate $9x$ and $8 \times 2x$ with £1 < x < £2 (M1 for trial with attempt to evaluate $9x$ and $8 \times 2x$ with £1 ≤ x ≤ £4) A1 for 1.6 and 3.2 C1 (dep on M2) for both "£1.60" and "£3.20" clearly identified for correct items with correct money notation [SC: B2 for both £1.60 cao and £3.20 cao clearly identified for correct items with correct money notation if no working shown]

Q10.

PAPER: 1MA0_2H				
Question	Working	Answer	Mark	Notes
(a)		'show'	2	M1 for $\frac{1}{2} \times (x - 4 + x + 5) \times 2$ or $2x \times (x - 4) + \frac{1}{2} \times 2x \times 9$ A1 for completion with correct processes seen
(b)		13	3	M1 for $\frac{-1 \pm \sqrt{1^2 - 4\times2\times-351}}{2\times2}$ condone incorrect sign for 351 M1 for $\frac{-1\pm\sqrt{2809}}{4}$ A1 for 13 NB for either M mark accept + only in place of ± **OR** M2 for $(2x + 27)(x - 13)$ (M1 for $(2x \pm 27)(x \pm 13)$) A1 for 13

Q11.

Question	Working	Answer	Notes
(a)		18	B1 cao
(b)		$5(x - 1)$	M1 for method to find inverse function A1 for $5(x - 1)$ or $5x - 5$
(c)		$9x - 48$ shown	M1 for method to find composite function A1 for working leading to $9x - 48$

Q12.

5MB3H/01 June 2015				
Question	Working	Answer	Mark	Notes
		$y = \frac{375}{x^2}$	3	M1 for $y \propto \frac{1}{x^2}$ or $y = \frac{k}{x^2}$ or $k = yx^2$ M1 for $5^2 \times 15$ (=375) A1 for $y = \frac{375}{x^2}$ or $y = \frac{k}{x^2}$ and $k = 375$

Q13.

Question	Working	Answer	Mark	Notes
(a)		$(x-y)(3x-3y-2)$	M1 A1	identify $x-y$ as a common factor , e.g. $(x-y)(\ldots\ldots..)$ oe
(b)		$\frac{3x}{2x-5}$	M1 M1 A1	factorise $2x^2+x-15$ [$=(2x-5)(x+3)$] or $3x^2+9x$ [$=3x(x+3)$] $\frac{1}{(2x-5)(x+3)} \times \frac{3x(x+3)}{1}$ cao

Q14.

Question		Working	Answer	Mark	Notes
	(a)	125 × 50.2 50 × 48.7 6275 – 2435 3840 ÷ 75	51.2	3	M1 for 125 × 50.2(=6275) or 50×48.7(=2435) M1 for (125 × 50.2 – 50 × 48.7) ÷ 75 A1 cao
	(b)		completed box plot	3	B3 for box plot with all three aspects (overlay) aspect 1: ends of whiskers at 18 and 96 aspect 2: ends of box at 32 and 72 aspect 3: median marked at 56 (B2 for box plot with two aspects, B1 for box plot with one aspect or correct quartiles and median identified)

Q15.

PAPER: 1MA0_2H				
Question	Working	Answer	Mark	Notes
	180-136-"34.4" =9.504	3.73	5	M1 for $\frac{\sin L}{12.8} = \frac{\sin 136}{15.7}$ M1 for $L = \sin^{-1}\left(\frac{\sin 136}{15.7} \times 12.8\right)$ or or $\sin^{-1}0.566\ldots$ A1 for 34.4 - 34.5 M1 for $\frac{LN}{\sin(180-136-'34.4')} = \frac{15.7}{\sin 136}$ or $\frac{LN}{\sin(180-136-'34.4')} = \frac{12.8}{\sin '34.4'}$ or $(LN^2 =)\ 15.7^2 + 12.8^2 - 2\times15.7\times12.8\times\cos(180 - 136 - '34.4')$ A1 for 3.73 - 3.74

Q16.

Question	Working	Answer	Mark	Notes
		width = $1\frac{2}{3}$ length = 9	P1 P1 P1 P1 P1 A1	start to process e.g. establishes that $x^2 = xy + 66$ process to form equation in one variable, e.g. substitute in: e.g. $(3y+4)^2 = y(3y+4) + 66$ or $x^2 = 66 + (x(x-4))/3$ process to arrive at equation to be solved $3y^2 + 10y - 25 = 0$ or $x^2 + 2x - 99 = 0$ oe process to solve, e.g. $(3y-5)(y+5) = 0$ or $(x-9)(x+11) = 0$ selection of $y = 5/3$ or $x = 9$ as only solution, and subs to find other variable y (width) = $1\frac{2}{3}$ (cm) and x (length) = 9 (cm)

Q17.

PAPER: 5MB3H_01				
Question	Working	Answer	Mark	Notes
		4.5, −0.75 oe	3	M2 for $(2x-9)(4x+3)$ oe (M1 for $(2x \pm 9)(4x \pm 3)$) oe A1 for 4.5, −0.75 oe [SC: B1 for 4.5 and −0.75 oe, found by any other method]

Q18.

Paper: 5MB3H_01					
Question		Working	Answer	Mark	Notes
			−4, 1	4	M1 for method to clear the fraction., eg $4-2x = x(x+1)$ oe M1 for rearranging to the form $ax^2+bx+c=0$ condone one error M1 (dep on previous M1) for a method to solve their quadratic equation A1 for −4 and 1

Q19.

Question	Working	Answer	Mark	Notes
		0.98	B1	cao

Q20.

Paper 1MA1: 3H			
Question	Working	Answer	Notes
(a)	$F(x) = x^3+4x-1$ $F(0) = -1,\ F(1) = 4$	Shown	M1 Method to establish at least one root in [0,1] eg. $x^3+4x-1(=0)$ and $F(0)\ (=-1),\ F(1)\ (=4)$ oe A1 Since there is a sign change there must be at least one root in $0 < x < 1$ (as F is continuous)
(b)	$4x = 1-x^3$ Or $\frac{x^3}{4}+x=\frac{1}{4}$	Shown	C1 C1 for at least one correct step and no incorrect ones
(c)	$x_1 = \frac{1}{4}-\frac{0}{4}=\frac{1}{4}$ $x_2 = \frac{1}{4}-\frac{\left(\frac{1}{4}\right)^3}{4}=\frac{1}{4}-\frac{1}{256}$	0.246(09375) Or $\frac{63}{256}$	B1 $x_1=\frac{1}{4}$ M1 M1 for $x_2=\frac{1}{4}-\frac{\left(\frac{1}{4}\right)^3}{4}$ A1 A1 for 0.246(09375) or $\frac{63}{256}$ oe

Q21.

Question	Working	Answer	Notes
	$\angle TSU = 360 \div 5$ (=72) Exterior angles of a polygon add up to 360°	proof	M1 for method to find interior or exterior angle of regular pentagon
	$\angle QRO = \angle OTP = 90$ The tangent to a circle is perpendicular (90°)to the radius (diameter)		M1 for using angle between tangent and radius
	$\angle ROT = 540 - 2 \times 90 - 2 \times 108$ (= 144)		M1 for method to find angle *ROT*
	$\angle RUT = 144 \div 2$ (= 72) The angle at the centre of a circle is twice the angle at the circumference		C1 for method to find angle *RUT* with reason
	Base angles of an isosceles triangle are equal		C1 for deduction that *ST* = *UT* with reasons

Q22.

PAPER: 1MA0_2H				
Question	Working	Answer	Mark	Notes
(a)		Circle drawn	2	B2 fully correct circle drawn (B1 for circle drawn with centre (0,0) or circle drawn with radius 4) OR M1 at least 5 correct points calculated and plotted A1 fully correct circle drawn
(b)		$x = 1.4$, $y = 3.8$ $x = -2.2$, $y = -3.4$	3	M1 for $y = 2x + 1$ drawn or for elimination of one variable A1 for one correct pair of values given or for $x = 1.4, -2.2$ (± 0.2) or ft from graph provided 2 marks in (a) A1 for second correct pair of values given (± 0.2) or ft from graph provided 2 marks in (a)

Q23.

Question	Working	Answer	Mark	Notes
		$\frac{1}{46}$	M1	$gf(x) = \frac{1}{3x^2 - 2}$ or f(4) = 48
			A1	oe

Q24.

Paper 1MA1: 3H			
Question	Working	Answer	Notes
(a)		$\frac{x+1}{4}$	M1 start to method eg. $y = 4x - 1$ or $x = \frac{y+1}{4}$
			A1 oe
(b)		$\frac{13}{16}$	P1 for start to process eg. $f(4k) = 16k - 1$ or $g(2) = \frac{12+1}{4}$
			A1

Q25.

Paper 1MA1: 1H			
Question	Working	Answer	Notes
(a)		25	C1 For interpretation eg.. area equated to 1750m P1 Process to solve equation A1
(b)		Description	C1 Start to interpret graph eg. describe or give acceleration for one stage of the journey or state that acceleration is constant in all 3 parts C1 Describe acceleration for all stages of the journey or give acceleration for all 3 stages (1.25 m/s^2 ; 0 m/s^2 ; -0.625 m/s^2)

Q26.

Paper 1MA1: 3H			
Question	Working	Answer	Notes
(a)	8, 13, 21,	34	B1 cao
(b)	$a, b, a+b, a+2b, 2a+3b$	Shown	M1 Method to show by adding pairs of successive terms C1 $a+2b, 2a+3b$ shown
(c)	$3a + 5b = 29$ $a + b = 7$ $3a + 3b = 21$ $b = 4, a = 3$	$a = 3$ $b = 4$	P1 Process to set up two equations P1 Process to solve equations A1

Q27.

Question	Working	Answer	Mark	Notes
(a)		6.66×10^7	M1 A1	for $6.5 \times 10^7 \times 1.006^4$ for 6.66×10^7 or $6.657(\ldots) \times 10^7$
(b)		explanation	C1	for explanation, e.g. growth is compound not simple oe, increase in population changes each year oe
(c)		Correct argument	M1 C1	for method to find the common ratio, e.g. finds population in 3 successive yrs or 1.006 for convincing conclusion, e.g. terms are generated by multiplying previous term by 1.006 so a geometric progression is formed

Q28.

Question	Working	Answer	Mark	Notes
(a)	$48 \div 4$	12	2	M1 $48 \div 4$ or $49 \div 4$ or $48 - 36$ A1 for 12
(b)		Box plot drawn	2	B2 fully correct box plot (B1 for the box plot drawn with one plotting error)
(c)		On Tuesday: Median higher (IQ) Range higher.	2	B1 for median higher on Tuesday or journeys took longer on Tuesday B1 for (IQ) range higher on Tuesday or more variation in journey length on Tuesday. (NB: For B2 at least one comparison must be in context)

Q29.

Question		Working	Answer	Mark	Notes
		$AB = 5 \sin 36 = \frac{5}{AD}$ $AD = \frac{5}{\sin 36}$ Or $\sin 36 = \frac{5}{BC}$ $BC = \frac{5}{\sin 36}$ $AD = BC$ OR $\cos 54 = \frac{5}{BC}$ $BC = \frac{5}{\cos 54}$	8.51	4	B1 $AB = 5$ M1 $\sin 36 = \frac{5}{AD}$ or $\frac{\sin 36}{5} = \frac{\sin 90}{AD}$ M1 $AD = \frac{5}{\sin 36}$ or $AD = \frac{5 \sin 90}{\sin 36}$ A1 8.5 – 8.51 OR M1 $\sin 36 = \frac{5}{BC}$ or $\frac{\sin 36}{5} = \frac{\sin 90}{BC}$ M1 $BC = \frac{5}{\sin 36}$ or $BC = \frac{5 \sin 90}{\sin 36}$ B1 AD ='BC' A1 8.5 – 8.51 OR B1 angle DCB = 54 or angle DBC = 36 M1 $\cos 54 = \frac{5}{BC}$ M1 $BC = \frac{5}{\cos 54}$ A1 8.5 – 8.51 NB other methods such as tan + Pythagoras must be complete methods and will earn M2

Q30.

PAPER: 1MA0_2H				
Question	**Working**	**Answer**	**Mark**	**Notes**
(a)		(4), 9, 8, 10, 12	2	M1 for correct calculation to find one frequency e.g. 0.9 × 10 or 1.6 × 5 or 1 × 10 or 0.8 × 15 or for one frequency correct or shows that 1 cm^2 = 1 A1 for all frequencies correct
(b)		$\frac{8}{43}$	2	M1 for 8 (people) or $\frac{2}{3}$ of "12" A1ft for 8 out of 43 stated as a percentage or fraction or decimal
(c)		26000	2	M1 ft for finding the interval in which the "21.5th" or "22nd" value lies or 26 or 25.5 A1 for 26000 or 25500

Q31.

Question		Working	Answer	Mark	Notes
		Rectangle – unshaded triangle $(x + 6)(3x – 5) – \frac{1}{2}\times 2x(3x – 5) = 3x^2 + 18x – 5x – 30 – (3x^2 – 5x)$ $= 3x^2 + 18x – 5x – 30 – 3x^2 + 5x$ QED OR $(x + 6)(3x – 5) – \frac{1}{2}\times 2x(3x – 5) = (x + 6)(3x – 5) – x(3x – 5) = (3x – 5)(x + 6 – x)$ $= 6(3x – 5) = 18x – 30$ QED OR Shaded trapezium + shaded triangle $\frac{1}{2}(x + 6 – 2x + x + 6)(3x – 5) = 6(3x – 5) = 18x – 30$ QED	Proof	4	M1 for using two lengths to find an area M1(dep) for '$(x + 6)(3x – 5)$' – '$\frac{1}{2} \times 2x(3x – 5)$' M1 for $3x^2 + 18x – 5x – 30$ or $\frac{1}{2}\times(6x^2 – 10x)$ or $3x^2 – 5x$ C1 for a correct completion of the proof resulting in $18x – 30$ from fully correct working OR M1 for using two lengths to find an area M1(dep) for '$(x + 6)(3x – 5)$' – '$\frac{1}{2} \times 2x(3x – 5)$' M1 for factorising process with $(3x – 5)$ as the common factor C1 for a correct completion of the proof resulting in $18x – 30$ from fully correct working OR M1 for $x + 6 – 2x$ $(= 6 – x)$ M2 for $\frac{1}{2}(x + 6 – 2x + x + 6)(3x – 5)$ C1 for a correct completion of the proof resulting in $18x – 30$ from fully correct working

Q32.

5MB1H_01					
Question		Working	Answer	Mark	Notes
			55 - 56	3	M1 for attempt to find 0.25×total area, eg 0.25×(3.6+14+5.6+7.2+1.4) (=7.95) condone one error M1 for ('7.95' – '3.6') ÷ 7 (=0.621…) A1 for 55 – 56 OR M1 for for attempt to find 0.25×total squares, eg 0.25×(90+350+140+180+35) (=198.75) condone one error M1 for ('198.75 – '90') ÷ 35 (=3.107…) A1 for 55 – 56

Q33.

Question		Working	Answer	Mark	Notes
*	(a)			1	C1 for a complete reason eg Angles in a semicircle are 90°, alternate segment theorem
	(b)		2.75	4	M1 for 7 × sin 35 M1 for 7 × sin 35 × 2 M1 (indep) for "*DB*"× cos 70 A1 2.74 - 2.75

Q34.

Question	Working	Answer	Mark	Notes
	42 ÷ 2 = 21 180 – 90 – 21 = 69 69 × 2 = 138	138°	3	M1 for 90 seen. A1 for 138 (accept 222) C1 for The tangent to a circle is perpendicular (90°) to the radius (diameter) and Angles in a triangle add up to 180° **OR** The tangent to a circle is perpendicular (90°) to the radius (diameter) and Angles in a quadrilateral (4 sided shape) add up to 360°

Q35.

Question	Working	Answer	Notes
		$\frac{1}{4}$	P1 starts process eg $\overrightarrow{AB} = 2\mathbf{b} - 2\mathbf{a}$ P1 process to find $\overrightarrow{AP}$ or $\overrightarrow{BP}$ P1 complete process to find $\overrightarrow{OP}$ A1 for $\frac{1}{4}$ oe

Q36.

Question	Working	Answer	Mark	Notes
21		$\frac{2}{5}$	P1	for process to find $\overrightarrow{AB}$ (= **b** – **a**) or $\overrightarrow{BA}$ (= **a** – **b**)
			P1	for process to find $\overrightarrow{MN}$ (= $-\frac{1}{2}$**b** + **a** + 2**a**) or $\overrightarrow{PN}$ (= –*k*(**b** – **a**) + 2**a**) or $\overrightarrow{MP}$ (= $-\frac{1}{2}$**b** + **a** + *k*(**b** – **a**) or $\frac{1}{2}$**b** + (1 – *k*)(**a** – **b**))
			P1	for process to find two of $\overrightarrow{MN}$, $\overrightarrow{PN}$ and $\overrightarrow{MP}$
			P1	for process to find *k*, using $\overrightarrow{MN}$ as a multiple of $\overrightarrow{PN}$ or using $\overrightarrow{MN}$ as a multiple of $\overrightarrow{MP}$ or using $\overrightarrow{PN}$ as a multiple of $\overrightarrow{MP}$
			A1	for $\frac{2}{5}$ oe

Q37.

Question	Working	Answer	Notes
	$\frac{2x-1}{x-4} = \frac{16x+1}{2x-1}$	$-\frac{1}{12}$, 5	P1 for process to write as an equation
	$(2x-1)^2 = (16x+1)(x-4)$		P1 for process to clear the fractions
	$12x^2 - 59x - 5 = 0$		P1 for process to write equation in form $ax^2 + bx + c = 0$
	$(12x+1)(x-5) = 0$		P1 for process to solve the equation
			A1 cao

Q38.

Paper 1MA1: 1H			
Question	**Working**	**Answer**	**Notes**
		$\frac{-2}{13}$	M1 multiplies all terms by 2 or 3 to reconcile fractions
			M1 complete process of expanding brackets and isolating *x* term
			A1 cao