<table>
<tr><th colspan="5">Paper: 1MA1/1H</th></tr>
<tr><th>Question</th><th>Working</th><th>Answer</th><th>Mark</th><th>Notes</th></tr>
<tr><td>1 (a)

(b)

(c)

(d)</td><td></td><td>10,19

positive

12 to 13

explanation</td><td>B1

C1

M1

A1

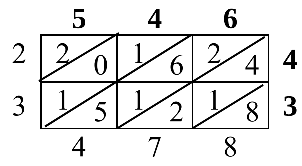
C1</td><td>cao

positive (correlation)

for an appropriate line of best fit drawn, or a point marked at (x, 16.4) or a horizontal line drawn from 16.4 across to (x, 16.4) where x is in the range 12 to 13
hours given in the range 12 to 13

(yes) e.g. as the majority of points for high temperature appear when there are more hours of sunshine (positive correlation)</td></tr>
<tr><td>2</td><td></td><td>2×2×2×7</td><td>M1

A1</td><td>for complete method to find prime factors; could be shown on a complete factor tree with no more than 1 arithmetic error
accept $2^3 \times 7$</td></tr>
<tr><td>3</td><td>21840
1638
23478


<table><tr><td></td><td>500</td><td>40</td><td>6</td></tr><tr><td>40</td><td>20000</td><td>1600</td><td>240</td></tr><tr><td>3</td><td>1500</td><td>120</td><td>18</td></tr></table>20000 + 1600 + 240 + 1500 + 120 + 18 = 23478</td><td>234.78</td><td>M1

A1

A1</td><td>for complete method with relative place value correct including addition of all the appropriate elements of the calculation e.g. two lines of 1st method, internal numbers of grids, or complete structure shown of partitioning methods

for digits 23478

(ft dep M1) for correct placement of the decimal point into their final answer</td></tr>
<tr><td>4</td><td></td><td>$x^2 + 6x = 1$</td><td>M1

M1

A1</td><td>writes the area using algebraic terms e.g. $(x + 3) \times (x + 3)$ or at least two correct area expressions which may be written on the diagram or x given as $\sqrt{10} - 3$
expands and includes the given 10 e.g. $x^2 + 3x + 3x + 9 = 10$; condone one error in the four terms when expanding or $10 - 3\sqrt{10} - 3\sqrt{10} + 9 + 6\sqrt{10} - 18$ (=1) condone 1 error in the 6 terms
rearranges to give the given equation or shows surd expression simplifies to 1</td></tr>
</table>

Paper: 1MA1/1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
5			70.5	P1	starts process of Pythagoras e.g. $5^2 + 12^2$
				P1	complete process for Pythagoras e.g. $\sqrt{5^2+12^2}$ or $\sqrt{25+144}$ or $\sqrt{169}$ (=13)
				P1	(dep P1 for Pythagoras) process of adding all the lengths e.g. 5 + 5 + 12 + 12 + "13" (=47)
				P1	(indep) process of multiplying at least 2 lengths by 1.5
				A1	cao SC: any evidence of working with Pythagoras award the P1 or P2
6			comparison	M1	starts to manipulate expression e.g. $3y = 9x – 6$ or $3y = 9x − 5$
				A1	gives equation(s) which can be used to show that the gradients of the two lines are the same e.g. $y = 3x – 5/3$
7			72	P1	for showing the process of 30 × 60 (=1800) or 20 × 54 (=1080)
				P1	(dep P1) for showing the complete process e.g. ("1800" – "1080") ÷ 10
				A1	concluding the answer is 72 (and not 66)
8	(a)		0.00000797	B1	cao
	(b)		6.3×10^7	M1	for partial calculation involving powers of 10 e.g. $0.63 \times 10^{5--3}$ or 6.3×10^n where $n \neq 7$ or for $n \times 10^8$ or for 63000000
				A1	cao
9			500	M1	recognition of 1.2 or 120% oe eg 600 ÷ 1.2 oe or $x \times 1.2 = 600$ oe or 120%=600
				A1	cao
10			$x^3+6x^2+11x+6$	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

Paper: 1MA1/1H					
Question		Working	Answer	Mark	Notes
11	(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
12	(a)		$\frac{1}{9}$	M1	for showing a method using either reciprocal or square root e.g. $\frac{1}{n}$ or 9 seen
				A1	cao Accept $\pm\frac{1}{9}$ or 0.1 recurring
	(b)		$\frac{16}{25}$	M1	for showing cube root of 64 as 4 and the cube root of 125 as 5 or $\frac{16}{n}$ ($n \neq 25$) or $\frac{n}{25}$ ($n \neq 16$) or an intention to find the cube root and square.
				A1	cao Accept 0.64
13	(a)		$y=\frac{9}{x^2}$	M1	begins to work with $y=\frac{k}{x^2}$ oe e.g. subs of a pair of numbers into $y=\frac{k}{x^2}$ or states k=9
				A1	for $y=\frac{9}{x^2}$ Accept $y=9x^{-2}$
	(b)		$\frac{3}{4}$	M1	ft (dep on previous M1) subs y = 16 into proportional formula of the form $y=\frac{k}{x^2}$ oe
				A1	oe

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Question	**Working**	**Answer**	**Mark**	**Notes**
14		$\frac{1}{3}$	P1	process to solve the problem e.g. $\frac{3}{10}\times\frac{4}{9}(=\frac{12}{90}=\frac{2}{15})$ OR finds the number of white circles for their chosen number OR for 9 : 21 (or a multiple of 9 : 21)
			P1	second step of the process e.g. $\frac{7}{10}\times\frac{2}{7}(=\frac{14}{70}=\frac{2}{10}=\frac{1}{5})$ OR finds the number of black circles for their chosen number OR for a multiple of 2 : 5 where the ratio parts sum to "21"
			P1	for complete process e.g. $"\frac{2}{15}"+"\frac{1}{5}"\left(=\frac{4}{30}+\frac{6}{30}\right)$ OR finds the total number of circles for their chosen number OR for 3 ratios that could be used to solve the problem eg 9 : 21 with 4 : 5 with 6 : 15
			A1	for $\frac{1}{3}$ oe
15 (a)		3.5 to 4.5	M1	substitution into formula $\frac{1}{3}\pi r^2 h$ of chosen values for r and V (accept r = 5.13 and V = 98) and starts rearrangement e.g. multiplies by 3, divides by π or divides by r^2 (both sides)
			M1	uses estimates in calculation e.g. $\frac{3\times100}{3\times25}$ (or in rearranged formula) or $\frac{12}{\pi}$
			A1	arrives at a single value from estimate in the range 3.5 to 4.5
(b)		more	C1	ft e.g. more since number in numerator goes up; numbers in denominator go down.
16		$2(2n-3)$ even	C1	correct expansion of brackets to give at least 3 terms from $n^2-2n-2n+4$
			C1	arrives at n^2-2-n^2+4n-4 oe
			C1	reduces to $2(2n-3)$ or $4n-6$
			C1	for conclusion e.g. $2(2n-3)$ always even, $4n-6$ is always even since both are even numbers, they are multiples of 2.

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Question	**Working**	**Answer**	**Mark**	**Notes**
17		$\frac{28}{72}$	P1	for $\frac{6}{8}$ or $\frac{2}{8}$ or $\frac{7}{8}$ or $\frac{1}{8}$ oe seen on diagram or in a calculation
			P1	for $\frac{7}{9} \times \frac{2}{8}$ or $\frac{2}{9} \times \frac{7}{8}$ or $\frac{14}{72}$ oe | for $\frac{7}{9} \times \frac{6}{8}$ or $\frac{2}{9} \times \frac{1}{8}$ or $\frac{42}{72}$ or $\frac{2}{72}$ or $\frac{44}{72}$ oe
			P1	for $\frac{7}{9} \times \frac{2}{8} + \frac{2}{9} \times \frac{7}{8}$ or "$\frac{14}{72}$" + "$\frac{14}{72}$" oe | for $1 - (\frac{7}{9} \times \frac{6}{8} + \frac{2}{9} \times \frac{1}{8})$ or $1 -$ ("$\frac{42}{72}$" + "$\frac{2}{72}$") or $1 -$ "$\frac{44}{72}$" oe
			A1	oe SC B1 for $\frac{14}{81}$ B2 for $\frac{28}{81}$
18		$y = -2x + 21$	P1	shows evidence of understanding that *AC* is perpendicular to *DB*, or states the gradient of *DB* as 0.5 oe
			P1	shows a process to find the gradient of a perp. line e.g. use of $-\frac{1}{m}$ or states $y = -2x$ + c or states the gradient of AC as −2
			P1	(dep on P2) for sub. of $x = 5$, $y = 11$ into $y = mx + c$ where m is their found gradient for AC.
			A1	oe

Paper: 1MA1/1H				
Question	**Working**	**Answer**	**Mark**	**Notes**
19		$\frac{2}{5}$	P1	for first step to solve the problem e.g. $\overrightarrow{AC} = -\,\mathbf{a} + \mathbf{c}$ or $\overrightarrow{OX} = \frac{1}{2}\mathbf{a} + \frac{1}{2}\mathbf{c}$ or demonstrates the location of D and X on the diagram
			P1	for a correct vector statement using $\overrightarrow{CD}$ eg $\overrightarrow{CD} = \overrightarrow{CX} + \overrightarrow{XD}$ or $\overrightarrow{CD} = \overrightarrow{OD} - \overrightarrow{OC}$ or $\overrightarrow{OD} = \frac{7}{2}\mathbf{c}$ or $\overrightarrow{CD} = 2.5\mathbf{c}$ oe
			P1	for a correct equation or ratio using k eg equating $\overrightarrow{XD} = 3\mathbf{c} - \frac{1}{2}\mathbf{a} = \frac{1}{2}(-\mathbf{a} + \mathbf{c}) + \frac{1}{k}\mathbf{c}$ or $\frac{\overrightarrow{OD}}{\overrightarrow{OC}} = \frac{k+1}{k}$ or $k = \frac{1}{2.5}$ or using a ratio approach eg $(\overrightarrow{OC} : \overrightarrow{CD}) = k : 1 = 1 : 2.5$
			A1	cao
20		$x = -\frac{24}{5}$ $y = -\frac{7}{5}$ $x = -3$, $y = 4$	M1	for substitution of a rearrangement of $y - 3x = 13$ e.g. $(3x + 13)^2 + x^2 = 25$
			M1	(dep M1) for expansion of bracket after substitution (at least 3 terms correct out of the 4 terms) e.g. $9x^2 + 39x + 39x + 169$
			M1	for forming quadratic ready for solving e.g. $10x^2 + 78x + 144$ (= 0)
			M1	for factorising e.g. $(5x + 24)(x + 3)$ (= 0) oe
			A1	$x = -\frac{24}{5}$, $y = -\frac{7}{5}$ and $x = -3$, $y = 4$ SC: B1 (if M0) for all 4 values mis-associated or one correct pair of values or values given as coordinates.

Paper: 1MA1/1H				
Question	**Working**	**Answer**	**Mark**	**Notes**
21			C1	states (angle) *ABC* = (angle) *BCD*
			C1	states 2nd link *AB* = *CD*
			C1	states 3rd link with reason: *BC* = *BC* (common)
			C1	concludes proof by stating (triangle) *ABC* ≡ (triangle) *DCB* with reason SAS and *AC* = *BD*
22		Proof	B1	(indep) for stating cos 30 = $\frac{\sqrt{3}}{2}$
			M1	for $PQ^2 = 10^2 + 10^2 - 2 \times 10 \times 10 \times \cos PBQ$ **or** $AC^2 = x^2 + x^2 - 2 \times x \times x \times \cos 30$ ($=x^2(2-\sqrt{3})$) oe
			M1	for $\cos PBQ = \frac{10^2+10^2-PQ^2}{2\times10\times10}$ (implies previous M1)
	cos PBQ= $\frac{10^2+10^2-x^2(2-\sqrt{3})}{200}$ $= \frac{200-x^2(2-\sqrt{3})}{200}$		M1	for $\cos PBQ = \frac{10^2+10^2-(x^2+x^2-2\times x\times x\times\cos 30)}{2\times10\times10}$
			A1	conclusion of proof with all working seen