Mark Scheme (Results)

January 2022

Pearson Edexcel International GCSE
Mathematics A (4MA1)
Paper 2H

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme.

  Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
- **Types of mark**
  - M marks: method marks
  - A marks: accuracy marks
  - B marks: unconditional accuracy marks (independent of M marks)
- **Abbreviations**
  - cao – correct answer only
  - ft – follow through
  - isw – ignore subsequent working
  - SC - special case
  - oe – or equivalent (and appropriate)
  - dep – dependent

- indep – independent
- awrt – answer which rounds to
- eeoo – each error or omission

- **No working**

  If no working is shown then correct answers normally score full marks

  If no working is shown then incorrect (even though nearly correct) answers score no marks.

- **With working**

  If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

  If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.

  If a candidate misreads a number from the question. Eg. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review. If there is a choice of methods shown, mark the method that leads to the answer on the answer line; where no answer is given on the answer line, award the lowest mark from the methods shown.

  If there is no answer on the answer line then check the working for an obvious answer.

- **Ignoring subsequent work**

  It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. Incorrect cancelling of a fraction that would otherwise be correct.

  It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.

  Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

- **Parts of questions**

  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded to another.

International GCSE Maths				
Apart from questions 2, 7, 10, 11, 17, 18, 21b and 26 the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method				
Q	**Working**	**Answer**	**Mark**	**Notes**
1 (a)	$2y - 4y + 8 - y^2$		2	M1 for 3 correct terms **or** for 4 correct terms ignoring signs **or** $\ldots - 2y - y^2$ **or** $8 - 2y - \ldots$
		$8 - 2y - y^2$		A1 Any order but simplified
(b)		$5b^3c(3b^2 - 7c^8)$	2	B2 fully correct **or** B1 for a correct partial factorisation with at least two terms outside the bracket eg $5b^3(3b^2c - 7c^9)$ or $5c\ (3b^5 - 7b^3c^8)$ etc **or** the fully correct factor outside the bracket with a two term expression in terms of b and c inside the bracket eg $5b^3c(15b^2 - c^8)$
				Total 4 marks

2	eg $\frac{27}{4}$ **and** $\frac{18}{7}$		3	M1	Both fractions expressed as improper fractions.
	$\frac{27}{4}\times\frac{7}{18}$ oe **or** eg $\frac{189}{28}\div\frac{72}{28}$			M1	Invert 2nd fraction or for both fractions expressed as equivalent fractions with denominators that are a common multiple of 4 and 7 (seeing this stage gains M2)
	eg $\frac{27}{4}\times\frac{7}{18}$ = $\frac{189}{72}$ = $\frac{21}{8}=2\frac{5}{8}$ **or** $\frac{27}{4}\times\frac{7}{18}$ = $\frac{189}{72}$ = $2\frac{45}{72}=2\frac{5}{8}$ **or** $\frac{27^{3}}{4}\times\frac{7}{18^{2}}=\frac{21}{8}=2\frac{5}{8}$ **or** $\frac{189}{28}\div\frac{72}{28}=\frac{189}{72}=2\frac{45}{72}=2\frac{5}{8}$ oe if the student clearly shows $2\frac{5}{8}=\frac{21}{8}$ then they only need to complete the LHS to $\frac{21}{8}$ (often done in 1st line of working)	shown		A1	dep M2 conclusion to $2\frac{5}{8}$ from correct working – either sight of the result of the multiplication e.g. $\frac{189}{72}$ must be seen then cancelled or correct cancelling prior to the multiplication with $\frac{21}{8}$ seen. NB entire solution using decimals scores no marks.
					Total 3 marks

3	(a)	$\frac{12}{4}(=3)$ **or** $\frac{4}{12}(=0.3\dot{3})$ **or** $\frac{BC}{4}=\frac{16.5}{12}$ **or** $BC\div16.5=4\div12$ **or** $(BC=)16.5\div\frac{12}{4}$ oe		2	M1	correct scale factor (given as 3 or a fraction or a ratio) **or** correct equation using *BC* **or** a correct expression for *BC* (award for SF even if not used)
			5.5		A1	
	(b)		$3x$	1	B1	allow $3 \times x$ or $x \times 3$ ft their "3" in (a)
						Total 3 marks

4	(a)		17.75	1	B1	oe
	(b)		18.25	1	B1	oe $18.249\dot{}$ (allow 18.249…)
						SC B1 for 17.5 in (a) **and** 18.5 (or $18.49\dot{}$)in (b)
						Total 2 marks

5 (a)	700 ÷ 200 (= 3.5)		3	M1	or 3.5 shown on diagram – within bounds of overlay
				M1	for line drawn at correct angle ± 2° within bounds of overlay
		C indicated in correct position		A1	for *C* drawn within bounds of overlay, inclusive of lines.
(b)		(1 :) 20 000	1	B1	
					Total 4 marks

6	$28 \div 0.35$ (= 80) oe eg $(28 \div 7) \times 20$ (= 80)		5	M1	indep for calculating total number of sweets
	$1-(0.2+0.35)$ (= 0.45) oe **or** (0.2 + 0.35) × "80" (= 44) or 28 + "16" (= 44)			M1	or for a correct equation for missing values eg $x + 2x + 0.2 + 0.35 = 1$ oe (can be implied by 2 probabilities that total 0.45 in table if not contradicted in working space)
	"0.45" ÷ 3 (= 0.15) oe **or** "0.45" × "80" (= 36) **or** "80" – "44" (= 36)			M1	(or 0.15 or 0.3 seen in table – either order)
	"80" × "0.15" **or** "80" × "0.3" (= 24) **or** "36" ÷ 3 or "36" ÷ $\frac{3}{2}$ (= 24)			M1	A correct calculation for the number of white sweets or the number of pink sweets
		12		A1	
6 alt	$1-(0.2+0.35)$ (= 0.45) or 100(%) – 20(%) – 35(%) = 45(%)		5	M1	or for a correct equation for missing values eg $x + 2x + 0.2 + 0.35 = 1$ oe
	"0.45" ÷ 3 (= 0.15) 45(%) ÷ 3 (= 15(%))			M1	(or 0.15 or 0.3 seen in table – either order)
	$\frac{n}{28}=\frac{0.15}{0.35}$ **or** $\left(\frac{n}{0.15}=\right)\frac{28}{0.35}$ oe or $\frac{n}{28}=\frac{0.3}{0.35}$ **or** $\left(\frac{n}{0.3}=\right)\frac{28}{0.35}$ **or** 35% = 28 so 5% = 4			M1	for using proportion with an expression for n white sweets or finding 5% oe to enable calculation to 15%
	$(n=)\ 28\times\frac{0.15}{0.35}$ **or** $(n=)\ 0.15\times\frac{28}{0.35}$ or 15% = 3 × 4 or $28\times\frac{0.3}{0.35}$ **or** $0.3\times\frac{28}{0.35}$ **or** 30% = 6 × 4 (= 24)			M1	a calculation using proportion that would lead to finding their n or $2n$
		12		A1	
					Total 5 marks

<table>
<tr><td>7</td><td>$2\times2\times7$ or $2\times3\times7$ or $3^2\times7$ oe condone 1's in factor tree

or showing at least 5 correct multiples across at least 2 lists (excluding 28, 42, 63)
(28) 56, 84, 112, 140, 168, 196, 224, 252
(42) 84, 126, 168, 210, 252
(63) 126, 189, 252</td><td></td><td>3</td><td>M1</td><td>accept prime factors seen in factor tree or correct position in Venn diagram for at least one of the numbers given.</td></tr>
<tr><td></td><td>$2\times2\times7$ and $2\times3\times7$ and $3\times3\times7$
or showing at least 9 correct multiples across all 3 lists (excluding 28, 42, 63)</td><td></td><td></td><td>M1</td><td>accept prime factors seen in factor tree or correct position in Venn diagram for all 3 of the numbers given.</td></tr>
<tr><td></td><td></td><td>252</td><td></td><td>A1</td><td>or $2^2\times3^2\times7$ oe Dep on M1</td></tr>
<tr><td>7 alt</td><td><table><tr><td>7</td><td>28</td><td>42</td><td>63</td></tr><tr><td>2</td><td>4</td><td>6</td><td>9</td></tr><tr><td>3</td><td>2</td><td>3</td><td>9</td></tr><tr><td></td><td>2</td><td>1</td><td>3</td></tr></table>oe
or
<table><tr><td>7</td><td>28</td><td>42</td><td>63</td></tr><tr><td>2</td><td>4</td><td>6</td><td>9</td></tr><tr><td>3</td><td>2</td><td>3</td><td>9</td></tr><tr><td>2</td><td>2</td><td>1</td><td>3</td></tr><tr><td>3</td><td>1</td><td>1</td><td>3</td></tr><tr><td>(1)</td><td>1</td><td>1</td><td>1</td></tr></table></td><td></td><td>3</td><td>M1</td><td>For one correct row in table
eg division by 7 gives 4, 6, 9</td></tr>
<tr><td></td><td></td><td></td><td></td><td>M1</td><td>Fully correct table – need only go as far as top table – we want to see prime factors along the side or prime factors along the sides and bottom (condone 1's)</td></tr>
<tr><td></td><td></td><td>252</td><td></td><td>A1</td><td>or $2^2\times3^2\times7$ oe Dep on M1</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>Total 3 marks</td></tr>
</table>

8	(a)	(231 776 – 228 314) ÷ 228 314 **or** 3462 ÷ 228 314 (= 0.01516…) **or** 231 776 ÷ 228 314 (= 1.01516…)		2	M1	
			1.5		A1	for 1.5 or better (1.516…) (be careful: 3462 ÷ 231 776 × 100 = 1.49….)
	(b)	231 776 ÷ 1.077 oe		3	M2	If not M2 then M1 for 100 + 7.7 (=107.7) or 1 + 0.077(=1.077) seen but not 1 + 7.7%
			215 000		A1	for 215 000 or better (215 205.19…) (if no marks awarded SCB1 for 212000 or better (211990.71…))
						Total 5 marks

9	$(0\times13)+1\times17+2\times8+3x+4\times11$ or (0 +) 17 + 16 + 3x + 44 (= 77 + 3x)			M1	at least **3** correct products with intention to add. eg award for 77 seen as this is sum of 3 products
	$(13+17+8+x+11)$ oe eg 49 + x **or** $98+2x$			M1	Sum for total frequency or (frequency × 2)
	$\frac{"77+3x"}{"49+x"}=2$ oe e.g. $"77+3x"=2("49+x")$			M1	for use of mean in valid equation (ft their values for sum of products and their total frequency if M2 awarded previously)
		21		A1	
					Total 4 marks

10	eg $6x + 10y = 6.2$ _ $6x + 3y = 3.75$ $7y = 2.45$ eg $30x + 15y = 18.75$____ $9x + 15y = 9.3$ $21x = 9.45$ **or** eg $6\left(\frac{3.1-5y}{3}\right)+3y=3.75$		3	M1	for correct method to eliminate one variable – multiplying one or both equations so the coefficient of x or y is the same in both (condone one arithmetic error), with the intention to subtract all 3 terms to eliminate one variable (intention to subtract is clearly showing a minus sign or subtracting 2 or 3 out of 3 terms) **or** isolating x or y in one equation and substituting into the other
	eg. $6 \times$ "0.45" $+ 3y = 3.75$ or $3 \times$ "0.45" $+ 5y = 3.1$ **or** $3x + 5 \times$ "0.35" $= 3.1$ or $6x + 3 \times$ "0.35" $= 3.75$			M1	dep. Substitute found value into one equation **or** correct method to eliminate second unknown.
		$x = 0.45$ oe $y = 0.35$ oe		A1	dep M1
					Total 3 marks

11	$\frac{360}{10}$ **(=** 36) ext angle **or** $\frac{(10 - 2)\times 180}{10}$ **(=** 144)		4	M1	method to find interior or exterior angle. (angles may be seen on diagram)
	$x =$ "144" – 90 (= 54) or $x = \frac{"540" - 3\times"144"}{2}$ (=54) or $x = 90 - "36" (= 54)$ 54 on the diagram is insufficient – must see working			M1	method to find x (must show it is intended to be x) eg use of int angle – 90º use of ext angle + x = 90º use of pentagon *GHIJA* All figures in " " must come from correct working
	$BAD = CDA = GDE = DGF = \frac{360 - 2\times"144"}{2} (= 36)$			M1	A correct method to find an angle of 36º within the shape (not exterior angle) or 36º shown in correct place in diagram
	There are other correct methods. Please check for correct working.	x = 54 y = 54		A1	dep on M3 to find each of x and y and the correct value of 54 for both from correct working
					Total 4 marks
ALT	ADG = "144" – 2 × "36" (= 72)			M1	
	JA is parallel to GD			M1	
	$DGA = DAG$ (y) [isosceles triangle]			M1	
	$x = DGA = y$	shown		A1	
	There are other correct methods. Please check for correct working.				**Total 4 marks**

12	216 or 2.16 or 10^{120} or 10^{122} or $6^3 \times 10^{40\times3}$		3	M1 or for digits 216
	216×10^{120} oe or or 2.16×10^n where $n \neq 122$			M1
		2.16×10^{122}		A1
				Total 3 marks

13		$x \geq -1$	1	B1 oe condone > in place of ≥
		$y \geq x$	1	B1 oe condone > in place of ≥
		$x + 2y \leq 8$	1	B1 oe condone < in place of ≤
				SCB1 if all inequalities reversed
				Total 3 marks

14	$12 \times \tan 5$ (=1.05) **or** $\tan 5 = \frac{'y'}{12}$ **or** $12\tan5$ **or** $\tan 85 = \frac{12}{'y'}$ **or** $\frac{12}{\tan 85}$ $\frac{y}{\sin 5} = \frac{12}{\sin 85}$ oe **or** (y =) 1.04986… oe		3	M1 oe correct expression using tan or the sine rule or $\sqrt{\left(\frac{12}{\cos 5}\right)^2 - 12^2}$ (= 1.04986…)
	(AB =) 2.6 + "1.05" oe			M1
		3.65		A1 allow awrt 3.65
				Total 3 marks

15	5 5 7 8 10 12 13 14 16 21 23		3	M1 For ordering the numbers Allow one error or omission in the list.
	16 & 7 identified for LQ and UQ			M1 For identifying 16 and 7 – may also have identified the median (12)
		9		A1
				Total 3 marks

16	*DFE* = 42° or *DOG* = 180 – 2 × 42 (= 96) or *EFG* = 90° or *EDG* = 90º or *DEG* = 90 – 42 (= 48)		4	M1	used or seen in diagram (must be clearly labelled if not in diagram)
		48°		A1	award 2 marks for 48 unless from an incorrect method
	angles in same segment **or** angles from same chord **or** angles at the circumference subtended from the same arc of the circle angles in a semicircle are 90° angles in a semicircle are 90° angle subtended by diameter is 90° angle at centre twice angle at circumference oe angles in a triangle add to 180 angles in a triangle add to 180			B2	Dep on a fully correct method to find angle *DFG* for a full set of reasons relevant to their method. B1 dep on M1 for at least one relevant **circle theorem.**
					Total 4 marks

17	eg $\frac{\sqrt{12}}{\sqrt{3}+2}\times\frac{\sqrt{3}-2}{\sqrt{3}-2}$		3	M1 rationalise denominator – award for seeing multiplication by $\frac{\sqrt{3}-2}{\sqrt{3}-2}$ or $\frac{-\sqrt{3}+2}{-\sqrt{3}+2}$
	eg $\frac{\left(\sqrt{36}-2\sqrt{12}\right)}{3-4}$ **or** $\frac{6-2\sqrt{12}}{-1}$ **or** $-6+2\sqrt{12}$ **or** $\frac{6-4\sqrt{3}}{-1}$ **or** $-6+4\sqrt{3}$			M1 dep M1 correctly simplifying numerator and denominator. (denominator could be 3 – 4 or –1)
		$-6+\sqrt{48}$		A1 dep M2 must be in correct form (including $\sqrt{48}$) allow $a = -6$ and $b = 48$
				Total 3 marks

18	eg $(2n + 1)^2 + (2n – 1)^2$ or $(2n + 1)^2 + (2n + 3)^2$ oe		3	M1	for setting up a correct algebraic expression (any letter can be used) must have intention to add (may come after expanding)
	Eg $4n^2 + 4n + 1 + 4n^2 – 4n + 1$ **or** $8n^2 + 2$ **or** $4n^2 + 4n + 1 + 4n^2 + 12n + 9$ **or** $8n^2 + 16n + 10$ oe			M1	correct expansion of brackets and correct signs or a correct result.
	eg $8 \times n^2 + 2$ $\frac{8n^2+16n+10}{8} = n^2 + 2n + \frac{10}{8}$ which shows a remainder of 2 or $10 – 8 = 2$ or $\frac{8n^2+16n+10}{8} = n^2 + 2n + 1$ remainder 2 oe $\frac{8n^2+16n+10}{8} = n^2 + 2n + 1 + \frac{2}{8}$ oe $8(n^2 + 2n + 1) + 2$ oe	shown clearly		A1	conclusion dep on M2 for eg $8n^2 + 2$ **and** a suitable conclusion (may be shown as a calculation/in numbers). The conclusion must be an intention to show that the result is a multiple of 8 and there is 2 remaining.
					Total 3 marks

19	$(PT =) \frac{12 \times 4}{3} (= 16)$		3	M1	NB: 16 from 12 + 4 is incorrect working
	$(r =)$ (“16” + 3) ÷ 2			M1	
		9.5		A1	oe
					Total 3 marks

20	at least **two** of 3, 8, 5, 2 seen **or** at least **two** correct frequency densities from 0.6, 0.8, 1, 1.2, 0.4 **or** eg one cm on FD axis = 0.25 **or** eg top of FD axis labelled 2 **or** eg 1 plant = 20 small squares **or** total small squares in at least 2 bars (60, 160, 100, 240, 40) **or** total number of 1 cm squares for at least 2 bars (2.4, 6.4, 4, 9.6, 1.6) oe		4	M1	At least 2 frequencies for other bars **or** scale on FD axis **or** eg 20 small squares represents 1 plant oe
	3 + 8 + 5 + 12 + 2 (= 30) **or** adding the number of small squares in all bars: 60 + 160 + 100 + 240 + 40 (= 600) **or** adding the number of 1 cm squares in all bars: 2.4 + 6.4 + 4 + 9.6 + 1.6 (= 24) oe			M1	add up 5 frequencies (allow one error) or adding the number of small squares in all bars (allow one error) or adding the number of 1 cm squares in all bars (allow one error) oe
	$\frac{0.25\times"12"+"2"}{"30"}$ **or** $\frac{0.25\times"240"+"40"}{"600"}$ **or** $\frac{0.25\times"9.6"+1.6}{"24"}$ **oe**			M1	ft their figures dep on the previous M1
		$\frac{1}{6}$		A1	oe eg $\frac{100}{600}$ allow 0.16(66…) ie 2 dp truncated or rounded or better
					Total 4 marks

21	(a)		–0.2 and 2.2	2	B2	Both correct to 1 decimal place (B1 for (–0.2, 0), (2.2, 0) **or** a single correct value to 1 decimal place **or** both values within –0.2 to –0.23 and 2.2 to 2.23)
	(b)	(y =) $–2x + 1$ oe seen		3	M1	Written – could be label on graph
		$y = –2x + 1$ drawn			M1	dep on previous M1 for drawing $y = –2x + 1$ passing through (–1, 3) and (2, –3) (allow 1 square tolerance)
			–0.6 and 1.6		A1	dep on M2 for both answers to 1 decimal place
						Total 5 marks

22	$(2x + 3)(x - 1) < 75$		5	B1	For writing the correct inequality sign with a correct calculation or correct value – this could be initially or saying that $x < 6$ at the end
	$2x^2 + x - 78 < 0$			M1	rearranged to form correct quadratic < 0 (allow = 0 or other incorrect inequality sign) oe
	$(x - 6)(2x + 13)$ (< 0) **or** $x = \frac{-1 \pm \sqrt{(1)^2 - (4 \times 2 \times -78)}}{2 \times 2}$ **or** $2\left(x + \frac{1}{4}\right)^2 - 2\left(\frac{1}{4}\right)^2 - 78 = 0$			M1	first step to find critical values from the correct quadratic
		$x = 6$		A1	$x = 6$ identified as critical value, ignore –6.5 if given
		$1 < x < 6$		A1	correct inequality
					Total 5 marks

23	$\frac{\sin Q}{4.2} = \frac{\sin 18}{1.6}$ oe or $1.6^2 = 4.2^2 + RQ^2 - 2\times 4.2\times RQ\times\cos 18$ oe		6	M1 correct sine ratio - could be rearranged or correct substitution into the cosine rule using angle R
	$\sin^{-1}\left(4.2\times\frac{\sin 18}{1.6}\right)$ (= 54.2) **or** $\sin^{-1}(0.811...)$ $\frac{2\times 4.2\times\cos 18 \pm \sqrt{(2\times 4.2\times\cos 18)^2 - 4\times 1\times 15.08}}{2}$			M1
	180 – "54.2" (=125.8) or RQ = 3.0585.. and 4.933…			M1 This can be implied by the correct value(s) (125.8 or 3.0585…) used later
	(P =) 180 –"125.8" – 18 (=36.2) **or** $RQ = \sqrt{4.2^2 + 1.6^2 - 2\times 4.2\times 1.6\times\cos"36.2"}$ (= 3.0585…) or 3.0585 chosen as value from cosine rule above **or** perpendicular height = 4.2sin"36.2" (= 2.4805…) (where "36.2" comes from correct working)			M1
	(Area =) $\frac{1}{2}\times 4.2\times 1.6\times\sin("36.2")$ **or** (Area =) $\frac{1}{2}\times 4.2\times"3.0585..."\times\sin 18$ **or** (Area =) $\frac{1}{2}\times 1.6\times"2.4805..."$			M1
		1.98		A1 awrt 1.98
				Total 6 marks

24	$(v =)\ 12t^2 - 27\ (= 0)$		5	M1	Correct differentiation
	$t^2 = \frac{27}{12}\quad (= \frac{9}{4})$ oe **or** $(3)(2t + 3)(2t - 3)\ (= 0)$			M1	dep M1 first stage to solve $v = 0$ by rearranging, factorising, quadratic formula, or completing the square
	$\sqrt{\frac{9}{4}}$ oe $(= \frac{3}{2})$ **or** $\pm\sqrt{\frac{9}{4}}$ oe $(= \pm\frac{3}{2})$			A1	Correct value of t (allow $\pm$)
	$(a =)\ 24t$			M1	dep 1st M1 for differentiating v
		36		A1	correct answer
					Total 5 marks

25 (a)	$(x-3)^2$ or $(3-x)^2$ or $(y-3)^2$ or $(3-y)^2$		4	M1	
	14 or – 14			M1	As part of an expression in x or y or an equation in x and y
	$3\pm\sqrt{14-x}$ or $3\pm\sqrt{14-y}$			M1	Can be $\pm$ or – or +
		$3+\sqrt{14-x}$		A1	oe must be in x
25 alt (a)	Alternative method: $x^2-6x+(y-5)=0$ oe or $y^2-6y+(x-5)=0$ oe		4	M1	rearrange to form a quadratic in x or y terms can be in any order but must be in an equation equal to zero
	$y=\frac{6\pm\sqrt{36-4(x-5)}}{2}$ or $x=\frac{6\pm\sqrt{36-4(y-5)}}{2}$			M1	correct substitution into quadratic formula
	$3\pm\sqrt{14-x}$ or $3\pm\sqrt{14-y}$			M1	Can be $\pm$ or – or +
		$3+\sqrt{14-x}$		A1	oe must be in x
(b)		$x \leqslant 14$	1	B1	oe **must** ft from part (a) dep on an answer in correct form
					Total 5 marks

26	$(Sm=)\ \frac{m}{2}(2a+(m-1)d)=39$ oe **or** $(S_2m=)\ \frac{2m}{2}(2a+(2m-1)d)=320$ oe		5	M1	one correct equation for S_m or S_{2m} (condone consistent use of n instead of m)
	$(Sm=)\ \frac{m}{2}(2a+(m-1)d)=39$ oe **and** $(S_2m=)\ \frac{2m}{2}(2a+(2m-1)d)=320$ oe			M1	both equations correct
	eliminate to get $dm^2=242$ oe			M1	
	$242 = 2 \times 11 \times 11$ or $242 = 2 \times 121$ oe			M1	
		$d=2$ $m=11$		A1	Dep on M2 Both correct
					Total 5 marks

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