

Question		Answer	Marks	Part Marks and Guidance	
1	(a)	$[x =] 5.5$	3	oe; nfw M2 for $2x = 11$ oe or M1 for x s or numbers collected and simplified correctly and M1FT for final answer FT <i>their</i> $ax = b$ or $ax - b = 0$ with $a \neq 1$ or 0 or b and $b \neq 0$, provided at least M1 earned SC2 for correct embedded answer	allow from trials
	(b)	$3n + 1$	2	oe; need not be simplified M1 for $3n$ oe SC1 for $3x + 1$ oe using other letters	accept $n \times 3$. $n3$ etc; [Common with Foundation]

2	(a)	48	1		Common
	(b)	$4(n + 2)$ or $4n + 8$	2	M1 for $4 \times n$ oe soi	Condone poor notation such as $n4$ etc or $n = 4n + 8$ Common

3	(a)		2, 6, 12	2	M1 for two correct in the correct positions or for 6, 12, 20 or 0, 2, 6	
	(b)		$10 - 3n$ oe	2	Accept unsimplified M1 for $3n$ or $-3n$ oe soi Or SC1 for $3 - 10x$ oe	Condone poor notation such as n^3 etc or $n = 10 - 3n$

4	(a)	96	2	nfw M1 for [6 ×] 16 Or SC1 for answers of -96 or 576	
	(b)	7, 11, 15	2	M1 for two terms in correct place Or SC1 for 3, 7, 11	eg M1 for 3, 11, 15
	(c)	$3y(2y + 3)$	2	M1 for $3y(\dots)$ or for $y(6y + 9)$ or for $3(2y^2 + 3y)$	Condone missing final bracket
	(d)	$\frac{15}{4}$ oe isw	3	M2 for $15 = 4x$ oe OR M1 for x s or numbers collected and simplified correctly M1FT for final answer FT <i>their</i> $ax = b$ with $a \neq 1$ or 0 or b and $b \neq 0$ Allow B3 for correct answer given embedded as final answer	Allow M1 for eg $2x = 6x - 15$ eg $2 \times \frac{15}{4} + 7 = 6 \frac{15}{4} -$
	(e)	$[x =] \frac{y-6}{4}$ or $\frac{y}{4} - 1.5$ oe	2	M1 for a correct constructive first step, or for answer correct except for a sign error	eg M1 for $\frac{6-y}{4}$ (sign error in denominator)

5	(a)	Vert. dist = $449 - 170$ or 279	M1	M1 for 279 seen	<u>Alternative method using trig:</u> M1 for vert. dist as opposite M1 for unit conversion as opposite M1 for use of \tan^{-1} to find an angle (note they could be finding either angle) M1 for correct selection of a length and trig ratio consistent with the angle found A1 for 2098.6 to 2100
		Unit conversion before Pythagoras/trig: Either Horiz. dist. = 1.293×1609 or 2080[.437..] Or Vert. dist. = <i>their</i> $279 \div 1609$ or 0.17[3...]	M1	Allow M1 for $449 \div 1609$ or $170 \div 1609$ or clear indication that either 449 [metres] = 0.279[...] or 0.28 [miles] or that 170 [metres] = 0.105[...] or 0.11 [miles]	
		<i>Their</i> $h^2 + \text{their } v^2$ [= 4406059 or 1.7019..]	M1	Allow even if units are not consistent	
		$\sqrt{\text{Their } h^2 \pm \text{their } v^2}$ 2098.6 to 2100	M1 A1	Allow even if units are not consistent Square root step may be implied	
	(b)	Use at least two triangles/use interim point	1		See exemplars

6	(a)	4, 7, 12	2	M1 for two correct (condone misplaced)	
	(b)	$5n - 2$ oe	2	Accept unsimplified M1 for $5n$ soi	Accept $5 \times n$, $n5$ etc; condone capitals or different letters used

7	(a)	(i)	$125\sqrt{2}$ final answer	1		
		(ii)	250	2	M1 for <i>their</i> (a)(i) $\times \sqrt{2}$	
	(b)		$500\sqrt{2}$	3	M2 for $\frac{1000}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$ or better Or M1 for $\frac{1000}{\sqrt{2}}$ oe	

8	(a)		$4n + 1$ oe	2	Mark final answer M1 for $4n$ oe Or SC1 for $4nth + 1$	Condone $4 \times n$, $n4$, use of other letters instead of n Ignore ' $n =$ ' or ' $nth =$ '
	(b)	(i)	3, 9, 27	2	B1 for two correct, in correct position Or SC1 for 1, 3, 9 or 9, 27, 81	B0 for 3, 6, 9
		(ii)	1 594 323 and 13^{th} term	3	B2 for one of these or 3^{13} as answer Or B1 for 1 594 323, 531 441 or 4 782 969 seen eg as trials	

9	(a) ♣	(i)	0	1		0/2 not sufficient
	♣	(ii)	45	1		
	(b) ♣		$4n - 2$ oe	2	Mark final answer M1 for $4n$ oe SC1 for $4n^{\text{th}} - 2$	Condone $4 \times n$, $n4$, use of other letters instead of n , or $4n + - 2$; ignore ' $n =$ ' or ' $n^{\text{th}} =$ '

10			998 and 200 correctly on answer lines	3	SC2 for $5 \times 200 - 2 = 998$ seen with answer lines not completed correctly (eg final answer wrong or they may not realise 200 th term) Or B1 for 998 on an answer line And M1 for 200 on an answer line or for $5n - 2 = 998$ or $5n = 1000$ or for at least two correct trials of $5n - 2$ with outcomes between 900 and 1100 for clear values of n , with n an integer If 0 in question, then SC1 for 3, 8 and 13 found (first three terms) or for any three trials of $5n - 2$ with correct outcomes for clear values of n , with n an integer	SC2 for eg $n = 200 \rightarrow 998$ oe
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11	(a)		9	2	M1 for sensible strategy such as 40, 80, 160 etc seen (must be at least 3 terms of correct / FT correct doubling, condoning only one error)	Or similarly working backwards from 1280: 640, 320, 160 etc NB working may be by given terms of sequence
	(b)	(i)	11, 18 as final answer	1		
		(ii)	$7n - 3$ oe	2	Accept unsimplified M1 for $7n$ oe soi	Condone poor notation such as $n7$ etc or $n = 7n - 3$

12	(a)		4, 10, 16	2	B1 for two of these correct and in the correct position or associated in working with correct value of n ; or B1 for -2, 4, 10	
	(b)		no, following work gaining both M marks	3	M1 for $n^2 = 200$ so and M1 for $\sqrt{200}$ or $10\sqrt{2}$ is not an integer, or $\sqrt{200} = 14.1\dots$ or M1 for $5 \times 14^2 = 980$ and M1 for $5 \times 15^2 = 1125$ or M1 for one of $5 \times 14^2 = 980$ and $5 \times 15^2 = 1125$ and M1 for $5 \times 14.1\dots^2 = 999$ to 1001 or for another trial of 14 to 15, so that the two trials have straddled 1000	e.g. M2 for '200 is not a square number' ignore subsequent trials once M2 earned