Sequences 1 Answers

1)

10 (a) (i)	$\frac{8\times(8+1)}{2}=36$ $1 + 2 + 3 + \ldots. + 8 = 36$	**E1** **E1**	
(ii)	80 200	**B1**	
(b) (i)	$2 (1 + 2 + 3 + \ldots.. + n) =$ $2 \times \frac{n(n+1)}{2} = n (n + 1)$	**E1**	both steps must be shown
(ii)	40 200	**B1**	
(iii)	40 000	**B1ft**	ft *their* **(a)(ii)** – *their***(b)(ii)** or *their* **(b)(ii)** – 200 ft Not for zero or negative answer
(c) (i)	$\frac{2n(2n+1)}{2}$ oe final answer	**B1**	e.g. $2n^2 + n$
(ii)	n^2 cao	**B2**	**M1** for *their* **(c)(i)** – $n(n + 1)$ or $n(n + 1) – n$ or $n/2(2+2(n-1))$ **[9]**

2)

(a)	**15, 21, 28, 36**	**B2**	**B1** for 3 correct
(b) (i)	10 + 15 = 25, 15 + 21 = 36 etc	**B1**	Any two complete and correct statements
(ii)	**Square**	**B1**	
(c) (i)	**2**	**B1**	
(ii)	$\frac{4\times5}{2}=10$ o.e.	**E1**	
(iii)	**16 290** c.a.o.	**B1**	
(d) (i)	$\frac{(n+1)(n+2)}{2}$ or $\frac{n^2+3n+2}{2}$ seen $\frac{n(n+1)}{2}+\frac{(n+1)(n+2)}{2}$ or $\frac{n^2+n}{2}+\frac{n^2+3n+2}{2}$ $\frac{(n+1)}{2}(n+n+2)$ $\quad$ $\frac{2n^2+4n+2}{2}$ $\frac{(n+1)(2n+2)}{2}$ $\quad$ n^2+2n+1 $(n+1)^2$ $\frac{2(n+1)(n+1)}{2}=(n+1)^2$	**M1** **M1** **E1**	Denominator could be their k May be implied by next line This line must be seen and at least one more step, without any error, to gain the E mark **Dependent on M1M1**. Fully established – no errors
(ii)	**1711 and 1770** final answers c.a.o.	**B2**	**SC1** for 59 **or** 58 **or** 1711 **or** 1770 seen **[12]**

Sequences 1 Answers

3)

(a)	Reasonable diagram, 25, 13, 62	4	**B1 B1 B1 B1**	diagram may be freehand
(b)	64, 19, 146	3	**B1 B1 B1**	
(c)	n^2 oe		**B1**	
	$2n + 3$ oe	2	**B1**	
(d)(i)	2	1		
(ii)	20202 **ft**	1**ft**	**ft** 10101 × their k	

4)

(a)	Dots all correctly placed in Diagram 4	1		
(b)	Column 4 16, 25, 16, 41 Column 5 25, 41, 20, 61 Column n: n^2, $4n$, $n^2 + (n + 1)^2$ oe	7	**B2 or B1** for three correct **B2 or B1** for three correct **B1 B1 B1** oe likely to be $(n-1)^2 + n^2 + 4n$ or $2n^2 + 2n + 1$ After any correct answer for column n, apply isw	
(c)(i)	79 601 cao	1		
(ii)	800 ft	1**ft**	**ft** their $4n$ linear expression only	
(d)	12 cao	1		

5)

(a)	(A 1) 8 27 64 125	2	B1 for 3 correct	
	(B 4) 8 12 16 20	1		
	(C 4) 9 16 25 36	2	B1 for 3 correct	
(b)	512	1		
	169	1		
(c)	25	1		
	99	1		
(d)	145 $n^3 + 4n$ oe	1, 1		
	16 $(n + 1)^2 - 4n$ oe but isw	1, 1	Likely oe is $(n-1)^2$	

6)

(a)	33, 41	**1**		
	$16\pi, 25\pi$	**1**		
	$20\pi, 30\pi$	**2**	**B1** each	
(b) (i)	$8n + 1$ oe final answer	**2**	e.g. $9 + 8(n-1)$, condone $n = 8n + 1$ **SC1** for $8n + k$	
(ii)	137 www2	**2**	**M1** for their (b)(i) = 1097	
(c) (i)	$n^2\pi$ oe final answer	**1**		
(ii)	$9n^2\pi$ oe final answer	**1**	Allow $(3n)^2\pi$	
(d)	$n(n+1)\pi$ oe final answer	**2**	**SC1** for a quadratic expression e.g. $n(n+1)$, $n^2 + 5$, $n^2 + n\pi$	

7)	**(a)** **(i)**	20	**1**	
	(ii)	$n - 4$ oe $n + 4$ oe $n + 6$ oe	**2**	Accept unsimplified **B1** for two correct
	(iii)	$(n - 4)(n + 4) - (n - 6)(n + 6)$	**M1**	ft from their algebraic expressions can be implied by $n^2 - 4n + 4n - 16 - (n^2 - 6n + 6n - 36)$ or $n^2 - 16 - (n^2 - 36)$
		$n^2 - 4n + 4n - 16 - (n^2 - 6n + 6n - 36)$ or better		Must have a line of algebra
		20	**E1**	With no errors or omission of brackets
	(b) **(i)**	24	**1**	
	(ii)	$(n - 5)(n + 5) - (n - 7)(n + 7)$ isw or $n^2 - 25 - (n^2 - 49)$ isw or $n^2 - 25 - n^2 + 49$ isw	**2**	**M1** for $n - 5$, $n + 5$, $n - 7$, $n + 7$ seen
	(c)	$(11 \times 23) - (9 \times 25)$ $253 - 225$ [= 28]	**E1**	Allow algebraic solution from $(n - 6)(n + 6) - (n - 8)(n + 8)$
	(d)	$4t$ oe	**1**	Accept unsimplified e.g. $n^2 - (t - 1)^2 - [n^2 - (t + 1)^2]$
	(e)	$c = 28$ and $d = 30$ 52	**1** **1**	