Question number	Scheme	Marks
9 (a)	$a + 3d = 108$	M1
	$a + 10d = 80$	A1
	(i) $7d = -28, \quad d = -4$	M1
	(ii) $a = 120$	A1 [4]
ALT	(7 terms dec by 28) $\therefore d = -\dfrac{28}{7}, = -4$	M1A1
	$80 = a + 10(-4) \quad \text{or} \quad 108 = a + 3(-4)$	M1
	$a = 120$	A1 [4]
(b)	$S_n = \dfrac{n}{2}\left(2 \times 120 - 4(n-1)\right)$	M1A1
	$S_n = \dfrac{4n}{2}(60 - n + 1) = 2n(61 - n)$ $*$	A1 cso [3]
(c)	$2n(61 - n) = 1100$	M1
	$2n^2 - 122n + 1100 = 0$	A1
	$(n - 11)(n - 50) = 0 \qquad n = 11, 50$	dM1A1 [4]
		Total 11 marks

		Notes
(a)	M1	For forming either $a + 3d = 108$ OR $a + 10d = 80$
	A1	For forming both $a + 3d = 108$ AND $a + 10d = 80$
	M1	For attempting to solve their simultaneous equations by any valid method.
	A1	Both $d = -4$ and $a = 120$
ALT 1		
(a)	M1	$d = \dfrac{80 - 108}{7} = ...$
	A1	$d = -4$
	M1	Uses either $a + 3d = 108$ or $a + 10d = 80$ and substitutes their d to find a value for a.
	A1	$a = 120$
No working: Award M1A1 for $d = -4$ with no working		
		Award M1A1 for $a = 120$ with no working
(b)	M1	Uses the **correct** summation formula with their a and their d.
	A1	A fully correct un-simplified summation formula with both values of a and d correct.
	A1 cso	Achieves the given answer of $S_n = 2n(61 - n)$
		Note this is a show question, every step must be seen for the award of this mark.
(c)	M1	States $2n(61 - n) = 1100$ or $1100 = \dfrac{n}{2}\big(2 \times '120' + (n-1) \times -4\big)$
	A1	Forms the correct 3TQ
		Note: The 3TQ does not need to $= 0$.
		For example, $1100 = 122n - 2n^2$ is acceptable for this mark.
	dM1	Solves their 3TQ by any method
	A1	$n = 11, 50$