1	$(N+1)^2 = (N^2 + 2N + 1)$ and $(N-1)^2 = (N^2 - 2N + 1)$		3	M1	
	$(N^2 + 2N + 1) - (N^2 - 2N + 1) = 4N$			M1	Must reach $4N$ correctly
		$N = 5x$ oe Therefore $4N = 20x$		A1	Dep. on M2. A correct conclusion (i.e. 20 "x") following fully correct working
	Alt: $N = 5x$ oe in both A and B			M1	
	$(5x+1)^2 = (25x^2 + 10x + 1)$ and $(5x-1)^2 = (25x^2 - 10x + 1)$			M1	
		$(25x^2 + 10x + 1) - (25x^2 - 10x + 1) = 20x$		A1	Dep. on M2. Subtraction of two correct brackets to reach 20 "x"
	Alt: $A^2 - B^2 = (A+B)(A-B)$ $A + B = 2N$ and $A - B = 2$			M1	
	$A^2 - B^2 = 2N \times 2 = 4N$			M1	
		$N = 5x$ oe Therefore $4N = 20x$		A1	Dep. on M2. A correct conclusion (i.e. 20 "x") following fully correct working
					Total 3 marks

2	e.g. $n^2 - (n-1)^2$ or $(n+1)^2 - n^2$		3	M1	for setting up a correct algebraic expression (any letter can be used)
	e.g. $n^2 - n^2 + 2n - 1$ or $n^2 + 2n + 1 - n^2$			M1	Correct expansion of brackets and correct signs or a correct result
		e.g. $2n - 1$ is always odd		A1	dep on M2 for eg $2n - 1$ or $2n + 1$ or $-(2n+1)$ oe **and** a suitable conclusion SCB1 for eg $(2n)^2 - (2n-1)^2$ or $(2n+1)^2 - (2n)^2$ oe
					Total 3 marks

3	eg $2n, 2n+2, 2n+4$ **or** $2n-2, 2n, 2n+2$ etc		3	M1	3 consecutive even numbers in algebraic form (any letter can be used)
	eg $(2n+4)^2 - (2n)^2$ $(= 4n^2 + 8n + 8n + 16 - 4n^2 \ (= 16n + 16))$ **or** $(2n+2)^2 - (2n-2)^2$ $(= 4n^2 + 4n + 4n + 4 - (4n^2 - 4n - 4n + 4) \ (= 16n))$			M1	for squaring the largest and smallest even numbers and subtracting (no need to expand or simplify for this mark)
	eg $8(2n+2) = 16n + 16$ **or** eg $16n + 16 = 8(2n+2)$ **or** eg $16n = 8(2n)$ **or** eg $8n + 8n = 8(n+n)$ **or** eg $\frac{16n+16}{2n+2} = 8$	Correctly shown		A1	dep on M2 for use of algebra to show correct conclusion (SCB1 for eg $(p+4)^2 - p^2$) (SCB2 for use of eg $(p+4)^2 - p^2 = 8p + 16 = 8(p+2)$ If the student shows this and also says "it is true for all numbers, so it must be true for even numbers" oe then this would gain M2A1
	Alternative				**Total 3 marks**
	eg a, b, c are consecutive even numbers where $a < b < c$ **and** one of $b = \frac{a+c}{2}$ **or** $a + c = 2b$ **or** $c - a = 4$ oe		3	M1	3 numbers defined as consecutive even numbers with one correct equation, writing one term in terms of one or more of the others or $c - a = 4$
	eg a, b, c are consecutive even numbers where $a < b < c$ **and** all of $b = \frac{a+c}{2}$ **and** $a + c = 2b$ **and** $c - a = 4$ oe			M1	3 numbers defined as consecutive even numbers with three correct equations that involve all letters in some place
	Now $c^2 - a^2 = (c-a)(c+a) = 4 \times 2b = 8b$	Correctly shown		A1	dep on M2 for use of algebra to show correct conclusion
					Total 3 marks

4	eg $(2m + 1)(2n + 1)$ or eg $(2m - 1)(2n + 3)$		4	M2	Product of 2 different odd numbers (in the form $2n + k$ where k is odd). Must have different letters/variables. (M1 for the product of same or different odd numbers where the variable is the same eg $(2n + 1)(2n - 1)$ or $(2n + 1)(2n + 3)$)
	eg $4mn + 2m + 2n + 1$ or eg $4n^2 + 4n + 1$ or eg $4n^2 - 1$ or eg $4n^2 + 8n + 3$			M1	dep M1 Multiplying out the two brackets with odd numbers correctly.
	eg $2(2mn + m + n) + 1$ therefore odd	Proved		A1	dep M3 Factorising and a conclusion **or** stating that the 3 leading terms are all even, hence result is odd.
					Total 4 marks

5	E.g. n, $n + 1$, $n + 2$ $(n^2 =) n^2$ $((n+1)^2 =) n^2 + n + n + 1 = n^2 + 2n + 1$ oe $((n+2)^2 =) n^2 + 2n + 2n + 4 = n^2 + 4n + 4$ oe or E.g. $n - 1$, n, $n + 1$ $((n-1)^2 =) n^2 - n - n + 1 = n^2 - 2n + 1$ oe $(n^2 =) n^2$ $((n+1)^2 =) n^2 + n + n + 1 = n^2 + 2n + 1$ oe		3	M1 for 3 appropriate terms for their 3 numbers **and** for correctly finding the expansion of at least 2 squares (Allow 2 × middle number + 2)
	$n^2 + n^2 + 2n + 2n + 4 (= 2n^2 + 4n + 4)$ oe and $2(n+1)^2 = 2n^2 + 2n + 2n + 2 (= 2n^2 + 4n + 2)$ oe or $n^2 - 2n + 1 + n^2 + 2n + 1 (= 2n^2 + 2)$ oe			M1 for finding the sum of first and last square **and** double the square of the middle (Allow 2 × middle number + 2)
	E.g. $2n^2 + 4n + 4 = 2n^2 + 4n + 2 + 2$ oe or $2(x+1)^2 + 2 = 2(x+1)^2 + 2$ oe or $2n^2 + 2 = 2n^2 + 2$ oe	Complete proof		A1 for conclusion from two correct expressions e.g. $2n^2 + 4n + 4$ **and** $2n^2 + 4n + 2$
				Total 3 marks

6	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

7	eg $2n$, $2n + 2$, $2n + 4$ **or** $2n - 2$, $2n$, $2n + 2$ etc		3	M1	for 3 consecutive even numbers in algebraic form (any letter can be used)
	eg $(2n)^2 + (2n+4)^2 (= 4n^2 + 4n^2 + 16n + 16 = 8n^2 + 16n + 16)$ **or** $2(2n+2)^2 \; (= 2(4n^2 + 8n + 4) = 8n^2 + 16n + 8)$ **or** $2(2n+2)^2 + 8 \; (= 2(4n^2 + 8n + 4) + 8 = 8n^2 + 16n + 16)$			M1	for the sum of the squares of the largest and smallest even numbers and adding **or** the square of the middle even number multiplied by 2 (no need to expand or simplify for this mark)
	eg $(2n)^2 + (2n+4)^2 = 8n^2 + 16n + 16$ and $2(2n+2)^2 + 8 = 8n^2 + 16n + 16$ **or** $(2n)^2 + (2n+4)^2 = 8n^2 + 16n + 16$ and $2(2n+2)^2 = 8n^2 + 16n + 8$ and $8n^2 + 16n + 16 - (8n^2 + 16n + 8) = 8$ **or** $(2n)^2 + (2n+4)^2 = 8n^2 + 16n + 16$ and $8n^2 + 16n + 16 = 8n^2 + 16n + 8 + 8 = 2(2n+2)^2 + 8$ **or** $2(2n+2)^2 + 8 = 8n^2 + 16n + 16$ and $8n^2 + 16n + 16 = 4n^2 + 4n^2 + 16n + 16 = (2n)^2 + (2n+4)^2$ *Working required*	Correctly shown		A1	dep on M2 for use of algebra to show correct conclusion (SCB1 for eg $(p + 4)^2 + p^2$ or $2(p + 2)^2$ or $2(p + 2)^2 + 8$) (SCB2 for use of eg $(p + 4)^2 + p^2 = 2p^2 + 8p + 16$ and $2(p + 2)^2 + 8 = 2p^2 + 8p + 16$ If the student shows this and also says “it is true for all numbers, so it must be true for even numbers” oe or defines p, $p + 2$, $p + 4$ as even numbers, then this would gain M2A1
					Total 3 marks