

Question Number	Scheme	Marks
4(a)	$S_2 = 2a + d = \frac{2}{3}(a + 4d)$ $S_4 = 2(2a + 3d) = a + 9d + 3$ $4a = 5d$ $a = d + 1$ (i) $d = 4$ (ii) $a = 5$	M1 (either) A1 (both) dM1A1A1 (5)
(b)	$S_{p+2} - S_p = t_{p+2} + t_{p+1}$ $5 + 4(p + 1) + 5 + 4p = 110$ $14 + 8p = 110$ $p = 12$ Alt: Use difference of sums with formula for sum (M1 complete method, A1 correct equation A1 correct answer)	M1A1 A1 cso (3) [8]

Notes

(a)

M1: for either a **correct** equation for S_2 **OR** S_4 A1: for **correct** equations for both S_2 **AND** S_4

dM1: for forming **and** attempting to solve **TWO** simultaneous equations in a and d only. This mark is dependent on the first method mark. Please check carefully that **both** equations are used to find a and d . $a = 5$ and $d = 4$ is a common answer coming from using only $4a = 5d$.

(i)

A1: for $d = 4$

(ii)

A1: for $a = 5$

(b)

M1: for the difference of S_{p+2} and S_p equated to the sum of t_{p+2} and t_{p+1} . Uses $a + (n-1)d$ for both and equates to 110, with an attempt to find p . The method must be complete for this mark.

A1: for fully correct substitution, so $5 + 4(p + 2 - 1) + 5 + (p + 1 - 1) = 110$ is fine for this mark.

A1: for $p = 12$ cso

Note: The final A mark is to be withheld from candidates who obtain a correct a and d from an incorrect method in part (a)

ALT

M1: for an attempt to find the difference of the summation formulae (using their a and d), equated to 110 with an attempt to find p . The summation formula must be correct for this mark.

$$S_{p+2} - S_p = \frac{p+2}{2}(2 \times 5 + (p+2-1)4) - \frac{p}{2}(2 \times 5 + (p-1)4) = 110$$

$$(p+2)(7+2p) - p(2p+3) = 110$$

$$8p + 14 = 110$$

$$p = 12$$

A1: for a fully correct substitution into $S_{p+2} - S_p$ with correct a and d .

A1: for $p = 12$ cso

Note: The final A mark is to be withheld from candidates who obtain a correct a and d from an incorrect method in part (a)