Question Number	Scheme	Marks
4	Arithmetic series $S_3 = 6p$	B1
	Geometric series $p + pr + pr^2 = p(1+r+r^2)$	B1
	$6p = p(1+r+r^2), \Rightarrow 6 = 1+r+r^2, \Rightarrow r^2+r-5=0$ 3TQ	M1
	$r = \dfrac{-1 \pm \sqrt{1^2 - 4\times1\times-5}}{2\times1}, \Rightarrow r = \dfrac{-1+\sqrt{21}}{2}$ ✻	M1d,A1
		(5)

Notes

B1 for a correct S_3 of $6p$ or ($p+2p+3p$) for the arithmetic series

B1 for a correct S_3 for the geometric series

M1 for equating the two series **AND** attempting to form a 3TQ in any order.

M1d for using the formula or completing the square (see General Guidance for an acceptable attempt) to solve the 3TQ

A1 for the given answer only

Note: $r=\dfrac{-1\pm\sqrt{21}}{2}$ **is A0**

Note: this is a show question. Sufficient working must be seen to award marks.

ALT

B1 uses summation formula for arithmetic series $S_3=\dfrac{3}{2}\left(2p+\left(3-1\right)p\right)$

B1 uses summation formula for geometric series $S_3=\dfrac{p\left(r^3-1\right)}{\left(r-1\right)}$ or $\dfrac{p\left(1-r^3\right)}{\left(1-r\right)}$

M1 for equating the two series, and attempting to form a cubic in r

$$\frac{3}{2}\left(2p+\left(3-1\right)p\right)=\frac{p\left(1-r^3\right)}{\left(1-r\right)}\Rightarrow r^3-6r+5=0$$

M1d for solving the cubic by;

- establishing that $(r-1)$ is a factor
- dividing their cubic by $(r-1)$ to achieve $r^2+r-5=0$
- for using the formula or completing the square

A1 for the given answer only

Note: $r=\dfrac{-1\pm\sqrt{21}}{2}$ **is A0**

Note: this is a show question. Sufficient working must be seen to award marks.