Question number	Scheme	Marks
5 (a)	$u_2 + u_4 = ar + ar^3 = 212.5$ $u_3 + u_4 = ar^2 + ar^3 = 62.5$	M1
	$\dfrac{(1+r^2)}{(r+r^2)} = \dfrac{17}{5}$	M1
	$12r^2 + 17r - 5 = 0$	M1
	$(4r-1)(3r+5) = 0$	dM1
	$r = \dfrac{1}{4} \qquad r = -\dfrac{5}{3}$	A1 (5)
(b)	$r = \dfrac{1}{4} \Rightarrow a = 800$ So $\dfrac{a}{1-r} = \dfrac{800}{\frac{3}{4}} = \dfrac{3200}{3}$	M1 A1 (2)
		Total 7 marks

Part	Mark	Guidance
(a)	M1	For either $ar + ar^3 = 212.5$ or $ar^2 + ar^3 = 62.5$ correct
	M1	For attempting to eliminate a or ar either by division or substitution: e.g. $\frac{ar(1+r^2)}{ar(r+r^2)} = \frac{212.5}{62.5} \Rightarrow \frac{(1+r^2)}{(r+r^2)} = \frac{212.5}{62.5} = \left(\frac{17}{5}\right)$ An attempt involves some factorisation to eliminate a or ar
	Method 1 – finds a 3TQ	
	M1	For forming a 3TQ in r only using their expressions. $(12r^2 + 17r - 5 = 0 \text{ oe})$ Accept for example $150r^2 + 212.5r - 62.5 = 0$
	dM1	For an attempt to solve their 3TQ to give **two** values of r See General Guidance for the definition of an attempt. For example: $(4r-1)(3r+5) = 0 \Rightarrow r = ..., ...$ This mark is dependent on the **FIRST** M mark being awarded
	Method 2 – finds a cubic equation	
	M1	For forming a cubic with a common factor of r in each term. e.g. $12r^3 + 17r^2 - 5r = 0$
	dM1	For factorising their cubic equation to achieve $r(12r^2 + 17r - 5) = 0$ and for an attempt to solve their 3TQ to give **two** values of r Ignore $r = 0$ if also given. See General Guidance for the definition of an attempt. For example: $(4r-1)(3r+5) = 0 \Rightarrow r = ..., ...$ This mark is dependent on the **FIRST** M mark being awarded
	A1	For the correct values; $r = \frac{1}{4}$ and $r = -\frac{5}{3}$ (reject $r = 0$ if seen earlier)
(b)	M1	Uses their $r = \frac{1}{4}$ [where $\lvert r \rvert < 1$] to find the value of a (800) with the correct formula for the sum of a geometric series to infinity. Condone an incorrect value of a even if they have used $r = \frac{1}{4}$ [The formula is given on page 2 of this booklet]. $S_\infty = \frac{a}{1-r} = \frac{'800'}{1-'\frac{1}{4}'} = ...$
	A1	For the correct value, $S_\infty = \frac{3200}{3}$ or $1066\frac{2}{3}$ Do not accept for example 1066.67 unless the stated value is $1066.\dot{6}$