

Question			Answer	Marks	AO	Guidance	
10			DR				
			$r(2x + 3) = x + 9$; $r(x + 9) = 2x - 6$; $r^2(2x + 3) = 2x - 6$	B1	3.1a	Obtain any correct equation in terms of r and x	Could be implied by later work May use other than r
			$\frac{x+9}{2x+3} = \frac{2x-6}{x+9}$ oe	M1*	3.1a	Attempt equation in terms of only x	This equation would imply the B1 Or correct equation in terms of only r
			$x^2 + 18x + 81 = 4x^2 - 12x + 6x - 18$ $3x^2 - 24x - 99 = 0$	A1	1.1	Obtain any correct equation not involving fractions or brackets	May still have like terms not yet combined May result in a cubic depending on method (probably $6x^3 - 39x^2 - 270x - 297 = 0$)
			$(x - 11)(x + 3) = 0$ $x = 11, x = -3$	A1	2.1	Solve quadratic BC to obtain both correct x values	Or solve cubic, to obtain three correct roots (third is likely to be $x = -1.5$)
			$r = \frac{4}{5}$, $r = -2$	A1	1.1	Obtain at least $r = \frac{4}{5}$	If second value of r given then it must be correct (if third value given then it must be consistent with their correct cubic roots)
			$S_{\infty} = \frac{a}{1-r} = \frac{25}{1-\frac{4}{5}}$	M1d*	3.2a	Attempt sum to infinity, using correct formula, with their r and their attempt at a	Must be using their numerical values for a and r with $ r < 1$ ISW using additional value(s) of r M0 if using their x and not attempt at a
			$S_{\infty} = 125$	A1	1.1	Obtain 125 only	A0 if additional solution

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			S_{∞} only exists for $ r < 1$, so $r = -2$ is not a valid solution	B1	2.5	Clear explanation as to why $r = -2$ is discarded	Must be considering correct r value, so B0 if rejecting $x = -3$ as $ -3 > 1$ Could generate the terms $-3, 6, (-12)$ and hence conclude with ‘divergent sequence’ If additional solutions for x and/or r from cubic then they must also be correct and explicitly rejected
				[8]			NB Eliminating x not r is a valid method, and could gain full credit. When solving their quadratic there is no need to see $r = -2$ (and hence $x = -3$) to award the A marks