

Question			Answer	Marks	AO	Guidance
11	(a)		If geometric, then $r = \frac{3k-6}{5k-2}$	M1	2.4	Allow instead for $r = \frac{k+2}{3k-6}$ or $r^2 = \frac{k+2}{5k-2}$ in any form Soi
			Common ratio gives $\frac{3k-6}{5k-2} = \frac{k+2}{3k-6}$ So $9k^2 - 36k + 36 = 5k^2 + 8k - 4$ So $k^2 - 11k + 10 = 0$	M1 A1	2.1 2.1	Forms an equation in k which need not be simplified AG Rearranges to correct three term quadratic. At least one intermediate step must be shown. SC1 for showing $k = 1$ leads to 3, -3, 3 ($r = -1$) and that $k = 10$ leads to 48, 24, 12 ($r = \frac{1}{2}$) and demonstrating that both are geometric
				[3]		
11	(b)		So $k = 1, 10$ When $k = 1$ the sum of 20 terms is $(3 + (-3)) + (3 + (-3)) + \dots + (3 + (-3)) = 0$	M1 M1 A1	1.1a 3.1a 1.1	Solves the quadratic to give at least one root Soi Evaluating the terms of the sequence when $k = 1$ cao
			Alternative for the last 2 marks $S_{20} = \frac{3(1 - (-1)^{20})}{1 - (-1)} = 0$	M1 A1		Using the formula for the sum of terms of a GP with $r = -1$ cao
				[3]		
11	(c)		When $k = 10$ the sequence is 48, 24, 12... So $a = 48, r = \frac{1}{2}$ $S_{\infty} = \frac{48}{1 - \frac{1}{2}} = 96$	B1 B1	3.1a 1.1	Identifies the first term and common ratio soi cao
				[2]		