Question	Answer	Marks	Partial Marks
11(a)(i)	$\frac{1}{q}-\frac{1}{p}=-\frac{1}{q}-\frac{1}{q}$ oe or $-\frac{1}{p}-(3-1)d=\frac{1}{p}+(2-1)d$ or $\frac{1}{p}=\frac{3}{2}\left\{\frac{2}{p}+(3-1)d\right\}$	**M2**	**M1** for $[d=]\frac{1}{q}-\frac{1}{p}$ or $[d=]-\frac{1}{q}-\frac{1}{q}$ or $[2d=]-\frac{1}{q}-\frac{1}{p}$ or $-\frac{1}{q}=\frac{1}{p}+(3-1)d$ or $\frac{1}{q}=\frac{1}{p}+(2-1)d$ or $\frac{1}{p}+\frac{1}{q}-\frac{1}{q}=\frac{3}{2}\left\{\frac{2}{p}+(3-1)d\right\}$
	correct completion to given answer $-\frac{2}{3p}$ e.g. $-\frac{1}{3p}-\frac{1}{3p}=-\frac{2}{3p}$ or $\frac{1}{3p}-\frac{1}{p}=\frac{1}{3p}-\frac{3}{3p}=-\frac{2}{3p}$ or makes d the subject of $-\frac{1}{p}-(3-1)d=\frac{1}{p}+(2-1)d$ or $\frac{1}{p}=\frac{3}{2}\left\{\frac{2}{p}+(3-1)d\right\}$	**A1**	
11(a)(ii)	$\left[u_{10}\text{oe or } \frac{k}{p}=\right]\frac{1}{p}+9\left(\frac{-2}{3p}\right)$	**M1**	
	$k=-5$	**A1**	

Question	Answer	Marks	Partial Marks
11(b)	$ar = 1.5$ and $\frac{a}{1-r} = 8$ oe, soi	**B1**	
	Correctly eliminates a: $\frac{3}{2r} = 8(1-r)$ oe	**M1**	
	$16r^2 - 16r + 3 = 0$ oe	**A1**	
	Attempts to solve *their* 3-term quadratic in r	**M1**	
	Correct solutions $r = \frac{3}{4}$ $r = \frac{1}{4}$	**A1**	
	Alternative method $ar = 1.5$ and $\frac{a}{1-r} = 8$ oe, soi	**(B1)**	
	Correctly eliminating r: $a\left(1 - \frac{a}{8}\right) = \frac{3}{2}$ oe	**(M1)**	
	$a^2 - 8a + 12 = 0$	**(A1)**	
	Attempting to solve *their* 3-term quadratic in a **and** use the values of a to find r	**(M1)**	
	Correct solutions $r = \frac{3}{4}$ $r = \frac{1}{4}$	**(A1)**	
12(a)	$\left[v = \frac{ds}{dt} =\right] 1 + 2\sin t$ soi	**B1**	
	Puts *their* $1 + 2\sin t = 0$ and solves for t	**M1**	**FT** $a + b\sin t$ where a and b are non-zero
	$t = \frac{7\pi}{6}$	**A1**	
	$s = \frac{7\pi}{6} + 2 - 2\cos\frac{7\pi}{6}$	**M1**	**FT** *their* $t \neq 0$; dep on previous **M1**
	7.4[0] or 7.397[24...] (metres) rot to 4 or more sig figs	**A1**	
12(b)	$t = \frac{11\pi}{6}$	**B1**	
12(c)	7.3972... + (7.3972... – 6.7123...)	**M1**	
	8.08[20...] (metres)	**A1**	

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