Question	Answer	Marks	Guidance
8(b)	$\left(\frac{9}{2},\ -2\right)$	**2**	**B1** for one correct **FT** on $2\times(their\ k)-their\frac{2}{5}$
	$\left(-\frac{51}{10},\ \frac{14}{5}\right)$	**2**	**B1** for one correct **FT** on $\left[\left(3\times their\ \frac{2}{5}\right)-(2\times their\ k)\right]$
9(a)	$\mathbf{c}-2\mathbf{a}$	**B1**	
9(b)	$4\mathbf{a}+\frac{2}{3}(their\ (\mathbf{c}-2\mathbf{a}))$ oe	**M1**	Alternative route: $OC + CB + BD = \mathbf{c} + 2\mathbf{a} - \frac{1}{3}\ their\ AB$
	$\frac{8}{3}\mathbf{a}+\frac{2}{3}\mathbf{c}$	**A1**	Allow unsimplified
9(c)	$\mu\left(their\ \left(\frac{8}{3}\mathbf{a}+\frac{2}{3}\mathbf{c}\right)\right)$	**B1**	Must be in terms of **a** and **c** in a valid vector form. Allow unsimplified
9(d)	$\overrightarrow{AC}=\mathbf{c}-4\mathbf{a}$	**B1**	
	$\lambda(their\ (\mathbf{c}-4\mathbf{a}))$	**B1**	Must be in terms of **a** and **c** in a valid vector form
9(e)	$4\mathbf{a}=$ *their* (c) – *their* (d) oe	**M1**	Must be in terms of **a** and **c** in a valid vector form
	$\lambda=\frac{1}{2},\ \mu=\frac{3}{4}$	**3**	**M1 dep** on first M1 for equating like vectors once **M1 dep** on first M1 for attempt to solve 2 simultaneous equations in λ and μ. leading to $\lambda=\ldots$ or $\mu=\ldots$ **A1** for both
10(a)	$\tan\theta=\frac{2}{7},\ \ \tan\theta=-1$	**2**	**M1** for attempt to factorise or use formula to obtain $\tan\theta=...$
	$15.9^{o},\ -164.1^{o},\ -45^{o},\ 135^{o}$	**2**	**A1** for two correct solutions **A1** for a further 2 correct solutions and no extras in the range

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Question	Answer	Marks	Guidance
10(b)	$\sin(3\phi - 1.5) = \frac{2}{3}$ $3\phi - 1.5 = 0.7297$	**M1**	Correct order of the operation Do not accept in degrees
	$3\phi - 1.5 = 2.41[12],\ 7.01[3]$	**A1**	soi by correct answers with no extras within the range
	0.743, 1.30, 2.84	**3**	**M1 dep** on first M1 for correct order of operations or one correct solution **A1** for one solution **A1** for a further 2 correct solutions and no extras in the range Do not accept in degrees
11(a)	$d = 3\log_x 3$ or $\log_x 3^3$ nfww	**B1**	Must be exact Allow $d = \log_x 27$ nfww
	$\frac{n}{2}(2\log_x 3 + 3(n-1)\log_x 3)$ nfww	**M1**	For use of sum formula with *their d* must be in the form of $\log_x 3$
	$\frac{n}{2}(3n-1)\log_x 3$ or $\left(\frac{3n^2}{2} - \frac{n}{2}\right)\log_x 3$	**A1**	Must be in the form of $k\log_x 3$
11(b)	$r = 3\tan^2\theta$	**B1**	soi
	$\lvert 3\tan^2\theta \rvert < 1$ or $[-1 <]3\tan^2\theta < 1$ or $\left[-\frac{1}{3} <\right]\tan^2\theta < \frac{1}{3}$ or $[0 <]\tan^2\theta < \frac{1}{3}$	**B1**	
	$\tan\theta < \frac{1}{\sqrt{3}}$ or $0 < \tan\theta < \frac{1}{\sqrt{3}}$	**B1**	
	$0 < \theta < \frac{\pi}{6}$	**B1**	

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