Question	Answer	Marks	Partial Marks
4	Correctly eliminates one unknown: $\frac{4}{(-2y)^2}+\frac{5}{4y^2}=1$ or $\frac{4}{x^2}+\frac{5}{4\left(-\frac{x}{2}\right)^2}=1$	**M1**	
	Simplifies and rearranges e.g. : $\frac{4}{4y^2}+\frac{5}{4y^2}=1 \rightarrow 4+5=4y^2$ or $\frac{4}{x^2}+\frac{5}{x^2}=1 \rightarrow 4+5=x^2$	**M1**	**FT** omitted brackets; condone one slip
	$y=\pm\frac{3}{2}$ and $x=\pm3$ oe	**A2**	**A1** for $y=\pm\frac{3}{2}$ or $x=\pm3$
	$\sqrt{(3--3)^2+(1.5--1.5)^2}$	**M1**	**FT** *their* $y=\pm\frac{3}{2}$ and $x=\pm3$ provided that no FT coordinate is 0
	$\sqrt{45}$ or $3\sqrt{5}$ indicated as final answer	**A1**	
5(a)	$\left[\frac{\mathrm{d}(x^3)}{\mathrm{d}x}=\right]3x^2$ and $x=\sqrt[3]{512}$ soi OR $\left[\frac{\mathrm{d}(\sqrt[3]{V})}{\mathrm{d}V}=\right]\frac{1}{3}V^{-\frac{2}{3}}$	**B1**	
	$\frac{\mathrm{d}x}{\mathrm{d}t}=\frac{\mathrm{d}V}{\mathrm{d}t}\times\frac{\mathrm{d}x}{\mathrm{d}V}$ oe, soi	**B1**	
	$\frac{480}{3(8)^2}$ oe	**M1**	**FT** *their* $\frac{\mathrm{d}V}{\mathrm{d}x}=k(8)^2$ or $\frac{\mathrm{d}x}{\mathrm{d}V}=k(512)^{-\frac{2}{3}}k\neq0$
	2.5 oe	**A1**	
5(b)	$12(8)\times$ *their* 2.5 soi	**M1**	**FT** *their* 8 provided it is not 512
	240	**A1**	**FT** provided at least M1 earned in **(a)**

Question	Answer	Marks	Partial Marks
6(a)	$\sqrt{16^2+7.5^2-2(16)(7.5)\cos\frac{2\pi}{7}}$ $+(16-7.5)+16\times\frac{2\pi}{7}$ oe, soi	**M2**	**M1** for $\sqrt{16^2+7.5^2-2(16)(7.5)\cos\frac{2\pi}{7}}+(16-7.5)$ or for $16\times\frac{2\pi}{7}$ seen
	35.6 or 35.6 to 35.614	**A1**	
6(b)	$\frac{1}{2}\times16^2\times\frac{2\pi}{7}-\frac{1}{2}\times16\times7.5\times\sin\left(\frac{2\pi}{7}\right)$ oe	**M2**	**M1** for either $\frac{1}{2}\times16^2\times\frac{2\pi}{7}$ or $\frac{1}{2}\times16\times7.5\times\sin\left(\frac{2\pi}{7}\right)$
	68[.0] or 67.98 to 68.0	**A1**	
7(a)	$\frac{dy}{dx}=3x^2-8x+6$	**B1**	
	Finds *their* $\left.\frac{dy}{dx}\right\|_{x=3}$	**M1**	condone one slip
	$m_{T_1}=9$	**A1**	
	$y-8=$ *their* $9(x-3)$ or $y=9x+c$ and $8=9(3)+c$	**M1**	
	$y=9x-19$ cao	**A1**	
7(b)(i)	$m_{T_2}=\frac{1}{\text{their}\,9}$	**B1**	**FT** *their* 9
7(b)(ii)	[Uses $y=x$ in *their* ($y=9x-19$) to form] *their* ($x=9x-19$) or *their* ($y=9y-19$) oe and solves for x or y or solves e.g. *their* $(9x-19)=$ *their* $\frac{x+19}{9}$	**M1**	
	$\left(\frac{19}{8},\frac{19}{8}\right)$ oe	**A1**	**FT** equal x and y coordinates providing at least 3 marks earned in **(a)**
8(a)(i)	479 001 600 oe	**B1**	
8(a)(ii)	$3\times10!\times4$ oe	**M1**	
	43 545 600 oe	**A1**	