Question	Answer	Marks	Guidance
8(b)	$\left(\frac{\pi}{6}, 0\right)$	**B1**	Allow for $x = \frac{\pi}{6}$
8(c)	$\left(\frac{\pi}{2}, -9\right)$	**2**	**B1** for $\frac{\pi}{2}$ **B1** for -9
9(a)	$y = x^3 - 2x^2 - 4x + 8$	**B1**	
	$\frac{dy}{dx} = 3x^2 - 4x - 4$ $(3x+2)(x-2) = 0$	**M1**	For attempt to differentiate, allow one slip and for equating *their* $\frac{dy}{dx}$ to zero and attempt to solve to obtain $x = k$
	$\left(-\frac{2}{3}, \frac{256}{27}\right)$	**A1**	
	$(2, 0)$	**A1**	
9(b)		**4**	**B1** for curve with maximum in the second quadrant **B1** for $y = 8$ either on the curve or stated **B1** for $x = \pm 2$ either on the curve or stated **B1** for a cusp at $x = -2$ and a min at $x = 2$
9(c)	$0 < k < \frac{256}{27}$	**2**	**FT** on *their* $\frac{256}{27}$ **B1** for either $0 < k$ or $k < \frac{256}{27}$
10(a)	$\overrightarrow{CD} = \frac{3}{4}\mathbf{a}$	**B1**	
	$\overrightarrow{OD} = \mathbf{c} + \frac{3}{4}\mathbf{a}$	**B1**	
	$\overrightarrow{OE} = h\left(\mathbf{c} + \frac{3}{4}\mathbf{a}\right)$	**B1**	
	$\overrightarrow{DE} = h\left(\mathbf{c} + \frac{3}{4}\mathbf{a}\right) - \left(\mathbf{c} + \frac{3}{4}\mathbf{a}\right)$ oe cao	**B1**	
10(b)	$\overrightarrow{DE} = \frac{1}{4}\mathbf{a} + k\mathbf{c}$	**B1**	

Question	Answer	Marks	Guidance
10(c)	$\mathbf{c}(h-1)+\mathbf{a}\left(\frac{3h}{4}+\frac{3}{4}\right)=\frac{1}{4}\mathbf{a}+k\mathbf{c}$	**M1**	For equating *their* answer to (a) to *their* answer to (b)
	$\mathbf{c}(h-1)+\mathbf{a}\left(\frac{3h}{4}+\frac{3}{4}\right)=\frac{1}{4}\mathbf{a}+k\mathbf{c}$ $h-1=k$	**M1**	For attempt to equate like vectors once.
	$h=\frac{4}{3}$	**A1**	
	$k=\frac{1}{3}$	**A1**	
11(a)	$x+2y=10$ $x+y=2$	**M1**	For attempt to solve simultaneously
	$(-6, 8)$	**A1**	
	$x+2y=10$ $x+y=-2$	**M1**	For attempt to solve simultaneously
	$(-14, 12)$	**A1**	
	Alternative $x^2+x(10-x)+\frac{(10-x)^2}{4}=4$ or $(10-2y)^2+2y(10-2y)+y^2=4$	**(M1)**	For attempt to eliminate one of the variables using $(x+y)^2=4$
	$x^2+20x+84=0$ or $y^2-20y+96=0$	**(M1)**	**Dep** for attempt to obtain a 3 term quadratic equation = 0 and solve to obtain at least one solution, allow 1 arithmetic error
	$(-14, 12)$	**(A1)**	
	$(-6, 8)$	**(A1)**	
	Mid-point of AB: $(-10, 10)$	**M1**	For attempt to obtain the mid-point using *their* coordinates for A and B.
	Gradient of line perpendicular to $AB = 2$	**M1**	For attempt to obtain the perpendicular gradient using *their* coordinates for A and B.
	$y-\textit{their}\ 10=\textit{their}\ 2(x-\textit{their}(-10))$	**M1**	
	$20-10=2(-5+10)$ oe	**A1**	For verification