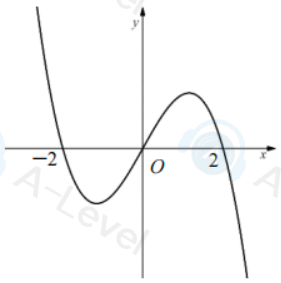
Question	Scheme	Marks
8(a)		B1B1B1
		(3)
(b)	$x\left(4-x^2\right)=\dfrac{A}{x}\Rightarrow 4x^2-x^4=A$ $\Rightarrow x^4-4x^2+A=0*$	B1*
		(1)
(c)	$A>0$	B1
	$b^2=4ac\Rightarrow 16=4A\Rightarrow A=...$	M1
	$0<A<4$	A1
		(3)
		Total 7

Question Number	Scheme	Marks
5. (a)	$x-2y+25=0$ $y=\dfrac{1}{2}x+\dfrac{25}{2}\Rightarrow y=-2x+...$ $y=-2x$	M1 A1 **(2)**
(b)	Substitutes $y=-2x$ into $x-2y+25=0\Rightarrow x+4x+25=0$ $\Rightarrow x=-5,\ y=10$	M1 A1, A1 **(3)**
(c)	Shortest distance $=\sqrt{5^2+10^2}=5\sqrt{5}$	M1, A1cso **(2)** **(7 marks)**

Question Number	Scheme	Marks
8(a)	$3x^2+6x+9=3(x\pm\ldots)^2\pm\ldots \qquad a=3$	B1
	$3x^2+6x+9=3(x+1)^2\pm\ldots \qquad a=3 \ \&\ b=1$	M1
	$3x^2+6x+9=3(x+1)^2+6$	A1
		(3)
(b)	$(-1,\ 6)$	B1ft
		(1)
(c)	$y=\alpha(x+4)(x+2)(x-3)$	B1
	$6=\alpha(-1+4)(-1+2)(-1-3)$	M1
	$\alpha=-\frac{1}{2}$	A1
	$y="-\frac{1}{2}"(x+4)(x+2)(x-3)\Rightarrow y=\ldots x^3+\ldots x^2+\ldots x+\ldots$	M1
	$A=-\frac{1}{2},\ B=-\frac{3}{2},\ C=5,\ D=12$	A1
		(5)
Alt (c)	$-64A+16B-4C+D=0$ $-8A+4B-2C+D=0$ $27A+9B+3C+D=0$	B1
	$-A+B-C+D=6$	M1
	One of $A=-\frac{1}{2},\ B=-\frac{3}{2},\ C=5,\ D=12$	A1
	Fully solves their simultaneous equations	M1
	$A=-\frac{1}{2},\ B=-\frac{3}{2},\ C=5,\ D=12$	A1
		(9 marks)

Question Number	Scheme	Marks
9(a)	$\frac{1}{2}x^2-10x+22=\frac{1}{2}(x\pm...)^2\pm...$ or states $a=\frac{1}{2}$	B1
	$\frac{1}{2}x^2-10x+22=\frac{1}{2}(x\pm10)^2\pm...$ or states $a=\frac{1}{2}$ and $b=\pm10$	M1
	$\frac{1}{2}x^2-10x+22=\frac{1}{2}(x-10)^2-28$	A1
		(3)
(b)	$("10","-28")$	B1ftB1ft
		(2)
(c)(i)	Gradient of tangent $=8$	B1
	$\frac{dy}{dx}=x-10=8\Rightarrow x=...$	M1
	$x=18,\ y=4$	A1A1
(c)(ii)	$k-\frac{1}{8}\times"18"="4"\Rightarrow k=\frac{25}{4}$	dM1A1
		(6)
(d)	One of x ... "10" or y „ $"\frac{25}{4}"-\frac{1}{8}x$ or y ... $\frac{1}{2}x^2-10x+22$	B1ft
	Two of x ... "10" or y „ $"\frac{25}{4}"-\frac{1}{8}x$ or y ... $\frac{1}{2}x^2-10x+22$	B1ft
	All three of x ... 10, y „ $\frac{25}{4}-\frac{1}{8}x$ and y ... $\frac{1}{2}x^2-10x+22$	B1
		(3)
		(14 marks)

Question	Scheme	Marks
1	$4x^2-3x+7\geqslant 4x+9$ $\Rightarrow 4x^2-7x-2...0\Rightarrow(4x+1)(x-2)...0\Rightarrow x=...$ or $\Rightarrow 4x^2-7x-2...0\Rightarrow x=\frac{-(-7)\pm\sqrt{(-7)^2-4(4)(-2)}}{2\times4}\Rightarrow x=...$ or $\Rightarrow 4x^2-7x-2...0\Rightarrow 4\left(x^2-\frac{7}{4}x-\frac{1}{2}\right)...0\Rightarrow 4\left(\left(x-\frac{7}{8}\right)^2-\left(\frac{7}{8}\right)^2-\frac{1}{2}\right)...0\Rightarrow x=...$	**M1**
	$x=-\frac{1}{4},2$	**A1**
	$x\leqslant"-\frac{1}{4}",\ x\geqslant"2"$	**M1**
	$x\leqslant-\frac{1}{4}$ or $x\geqslant2$ oe	**A1**
		(4)
		(4 marks)

Question	Scheme	Marks
11(a)	$x=\frac{5\pi}{2}$ **or** $y=12$	B1
	$x=\frac{5\pi}{2}$ **and** $y=12$	B1
		(2)
(b)	$x=\frac{3\pi}{2}$ **or** $y=-21$	B1
	$x=\frac{3\pi}{2}$ **and** $y=-21$	B1
		(2)
(c)(i)	$(A=)-12$	B1
(ii)	$(B=)\frac{5\pi}{4}$	B1
		(2)
		Total 6

Question Number	Scheme	Marks
1. (a)	Attempts gradient $=\frac{20--4}{-5-3}=(-3)$	M1
	Attempts equation of line $y-20="-3"(x+5)$ or $y+4="-3"(x-3)$	dM1
	$y=-3x+5$	A1
		(3)
(b)	Gradient $\frac{1}{3}$ or midpoint $(-1,8)$	B1ft
	$y-8=\frac{1}{3}(x+1)$	M1
	$x-3y+25=0$	A1
		(3)
		(6 marks)