Question Number	Scheme	Marks
5. (a)	$20x^3-50x^2-30x=0 \Rightarrow 10x\left(2x^2-5x-3\right)=0$	
	$\Rightarrow 10x(2x+1)(x-3)=0$	M1
	$\Rightarrow x=0,-\frac{1}{2},3$	A1, A1
		(3)
(b)	Sets or implies $(y+3)^{\frac{1}{2}}=0$ or $-\frac{1}{2}$ or 3	B1ft
	Full method to find y	M1
	$y=6$	A1ft,
	$y=-3,\ 6$	A1
		(4)
		(7 marks)

2.(a)	Attempts $A=\frac{1}{2}ab\sin C \Rightarrow 100=\frac{1}{2}\times 25\times 15\sin BAC$	M1
	$\sin\theta^\circ=\frac{8}{15}$	A1
		(2)
(b)	$\left(BC^2\right)=15^2+25^2-2\times 15\times 25\times\cos"\theta^\circ"$ where $\theta^\circ=\arcsin"\frac{8}{15}"$	M1
	$BC^2=15^2+25^2-2\times 15\times 25\times\cos\left(180-\text{their }'32.2'\right)\Rightarrow BC=\ldots$	dM1
	$BC^2=1484.4\ldots\Rightarrow BC=$ awrt 38.5 cm cso	A1
		(3)
		(5 marks)

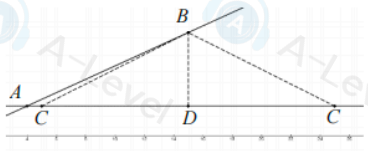
Question Number	Scheme	Marks
7 (a)	States or implies that B is $(10,6)$	B1
	$\left(AB^2\right)=(10-0)^2+("6"-2)^2\Rightarrow AB=2\sqrt{29}$	M1, A1
		(3)
(b)	States or implies that grad $AB=\frac{2}{5}$	B1
	Uses perpendicular gradient rule $\Rightarrow$ grad $l_2=-\frac{5}{2}$	M1
	$y-"6"="-\frac{5}{2}"(x-10)\Rightarrow 5x+2y-62=0$	dM1, A1
		(4)
(c)	C is $\left(\frac{62}{5},0\right)$	B1 ft
	$\left(BC^2\right)=\left(\frac{62}{5}-10\right)^2+("6"-0)^2\Rightarrow BC=\frac{6\sqrt{29}}{5}=(6.46)$	
	Area $ABCD=69.6$	M1, A1
		(3)
		(10 marks)

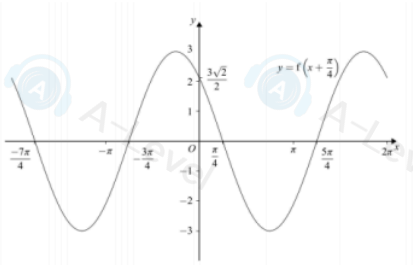
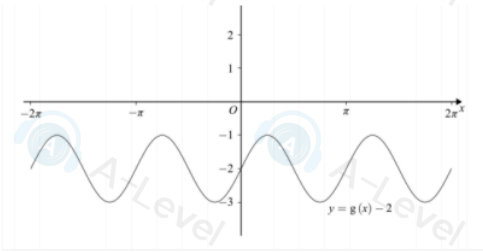
Question Number	Scheme	Marks
1. (a)	Attempts gradient $= \frac{20--4}{-5-3} = (-3)$	M1
	Attempts equation of line $y-20="-3"(x+5)$ or $y+4="-3"(x-3)$	dM1
	$y=-3x+5$	A1
		(3)
(b)	Gradient $\frac{1}{3}$ or midpoint $(-1, 8)$	B1ft
	$y-8=\frac{1}{3}(x+1)$	M1
	$x-3y+25=0$	A1
		(3)
		(6 marks)

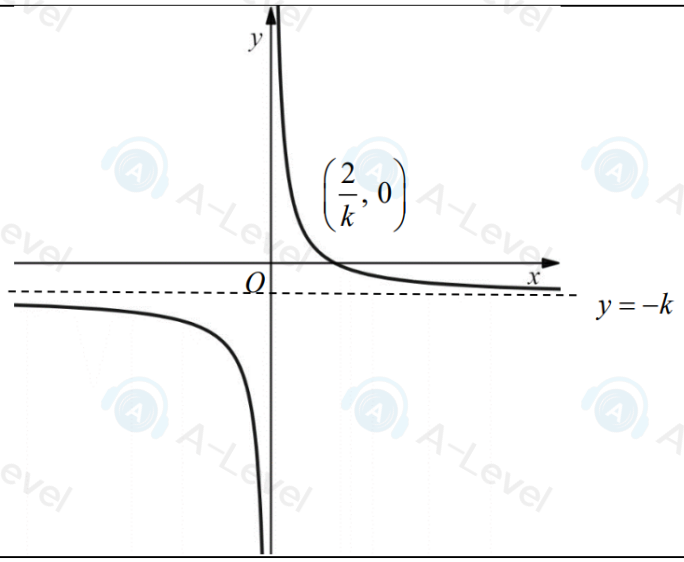
Question	Answer	Marks	Guidance
9(a)	$6\sin 0.9 = \frac{AC}{2}$ or $AC^2 = 6^2 + 6^2 - 2\times 6\times 6\cos 1.8$	**M1**	OE Correct working in degrees is acceptable throughout.
	$AC = 9.40$	**A1**	SOI Accept 9.39 – 9.41, may be used but not seen for A1.
	Angle $CAB = ½(\pi - 1.8)$	**M1**	SOI Expect 0.6708 (or 0.671).
	Arc CD = *their* 9.40 × *their* 0.6708	**M1**	Expect 6.306 (or 6.31), do not accept 6 for *their AC* or 1.8 for *CAB*.
	[Perimeter = 6 + 3.40 + 6.306 =] 15.7	**A1**	Accept 15.69 – 15.72.
		5	

Question Number	Scheme	Marks
4 (a)	States or implies that $[f(x)=]kx(x-4)$	M1
	Attempts to find k. E.g. $-4.8 = k\times 2\times(2-4) \Rightarrow k = ...$	dM1
	$[f(x)=]1.2x(x-4)$	A1
		(3)
(b)	States or implies that $[g(x)=]\lambda x(x-4)^2$	M1
	Attempts to find λ . E.g. $7.2 = \lambda\times 6\times(6-4)^2 \Rightarrow \lambda = ...$	dM1
	$[g(x)=]0.3x(x-4)^2$	A1
		(3)
(c)	Sets their $1.2x(x-4) = 0.3x(x-4)^2$	B1ft
	Valid attempt to solve $1.2\cancel{x}\cancel{(x-4)} = 0.3\cancel{x}(x-4)^{\cancel{2}} \Rightarrow x = 4 + \frac{1.2}{0.3}$	M1
	$x = 8$	A1
	$(8, 38.4)$	A1
		(4)
		(10 marks)

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

Question	Scheme	Marks
9(a)	$m=\dfrac{7-2}{15-4}\left(=\dfrac{5}{11}\right)$	M1
	$y-2=\dfrac{5}{11}(x-4)$ or $y-7=\dfrac{5}{11}(x-15)$ or $y=\dfrac{5}{11}x+c\Rightarrow 2=\dfrac{5}{11}\times 4+c\Rightarrow c=\ldots\left(\dfrac{2}{11}\right)$	M1
	$5x-11y+2=0$	A1
		(3)
(a) ALT	$y=mx+c\Rightarrow \begin{matrix}2=4m+c\\7=15m+c\end{matrix}$	M1
	$\begin{matrix}2=4m+c\\7=15m+c\end{matrix}\Rightarrow m=\ldots\left(\dfrac{5}{11}\right),\quad c=\ldots\left(\dfrac{2}{11}\right)$	M1
	$5x-11y+2=0$	A1
(b)	$(15-x)^2+(7-2)^2=\left(5\sqrt{5}\right)^2$ or e.g. $\sqrt{(15-x)^2+(7-2)^2}=5\sqrt{5}$ or e.g. $\left(5\sqrt{5}\right)^2=5^2+CD^2$ oe 	M1
	Way 1: $(15-x)^2+25=125\Rightarrow(15-x)^2=100\Rightarrow x=\ldots$ or e.g. Way 2: $125=25+CD^2\Rightarrow CD^2=100\Rightarrow CD=10\Rightarrow x=\ldots$	M1
	$(5,\ 2)$ **or** $(25,\ 2)$	A1
	$(5,\ 2)$ **and** $(25,\ 2)$	A1
		(4)
(c)	Area $=\dfrac{1}{2}("5"-4)\times 5$	M1
	$=\dfrac{5}{2}$	A1
		(2)
		Total 9

Question	Scheme		Marks
9(i)(a)	$(y=)3\cos(x)$		M1 A1
			(2)
(b)		Same shape translated left or right	B1
		All x intercepts labelled correctly.	B1
		Correct y intercept $\frac{3\sqrt{2}}{2}$	B1
			(3)
(ii)(a)	$(y=)\sin(2x)$		M1 A1
			(2)
(b)		Same shape translated down below the x-axis.	B1
		Correct y intercept -2 labelled.	B1
			(2)
			(9 marks)

Question Number	Scheme	Marks
7(a)		B1B1B1
		(3)
(b)	$-kx-6=\frac{2}{x}-k \Rightarrow -kx^2-6x=2-kx \Rightarrow kx^2+(6-k)x+2=0$	M1
	$(6-k)^2-4\times k\times 2 \Rightarrow k^2-20k+36$	dM1A1
	$\Rightarrow$ CVs $=2, 18 \Rightarrow k<$"2" or $k>$"18"	M1
	$(0<)k<2$ or $k>18$	A1
		(5)
		(8 marks)

Question Number	Scheme	Marks
2a	$\frac{1}{8}x$	B1
		(1)
b	$\frac{1}{256}x^{\frac{3}{2}}$	B1
		(1)
c	$\left(\frac{1}{2}\left(\frac{1}{64}x^2\times\frac{16}{\sqrt{x}}\right)\right)^{-\frac{4}{3}}=\left(\frac{1}{8}x^{\frac{3}{2}}\right)^{-\frac{4}{3}}=16x^{-2}$	M1A1
		(2)
		(4 marks)

(a)

Question Number	Scheme	Marks
3(a)	$(f(x)=)-3\cos x$ or $(f(x)=)3\sin(x-90°)$	M1 A1
		(2)
(b)(i)	8	B1
(ii)	5	B1
		(2)
		(4 marks)

Question Number	Scheme	Marks
9 (a) (i)	Stretch parallel to the x-axis $\times\frac{1}{2}$ or stretch parallel to the y-axis $\times\sqrt{2}$	M1, A1
(ii)	Translate by the vector $\begin{pmatrix}0\\12\end{pmatrix}$ (or translate up by 12 (units))	M1, A1
		(4)
(b) (i)	$12-\sqrt{x}=\sqrt{2}\sqrt{x}$	
	$12=\left(\sqrt{2}+1\right)\sqrt{x}$	M1
	$\Rightarrow\sqrt{x}=\frac{12}{\sqrt{2}+1}\times\frac{\sqrt{2}-1}{\sqrt{2}-1}=12\left(\sqrt{2}-1\right)$ *	dM1, A1 *
Alt (i)	$12-\sqrt{x}=\sqrt{2x}\Rightarrow\left(12-\sqrt{x}\right)^2=2x\Rightarrow x+24\sqrt{x}-144=0$	M1
	$\Rightarrow\left(\sqrt{x}\right)=\frac{-24\pm\sqrt{24^2-4\times-144}}{2}=-12\pm\frac{12}{2}\sqrt{4+8}=-12\pm12\sqrt{2}$	dM1
	$\sqrt{x}>0\Rightarrow\sqrt{x}=-12+12\sqrt{2}=12\left(\sqrt{2}-1\right)$*	A1
(ii)	$\Rightarrow x=12^2\left(\sqrt{2}-1\right)^2=144\left(2+1-2\sqrt{2}\right)=144\left(3-2\sqrt{2}\right)$	M1, A1
	$y\left\{=12-\sqrt{x}=12-12\left(\sqrt{2}-1\right)\right\}=12\left(2-\sqrt{2}\right)$	B1
	Or common acceptable alt forms: $P\left(432-288\sqrt{2},\quad 24-12\sqrt{2}\right)$	
		(6)
		(10 marks)