Question	Answer	Marks	Partial Marks
7	$\frac{\mathrm{d}}{\mathrm{d}x}(\mathrm{e}^{4x}) = 4\mathrm{e}^{4x}$ soi	**B1**	
	$4\mathrm{e}^{4x}\tan x + \mathrm{e}^{4x}\sec^2 x$	**M1**	**FT** *their* $4\mathrm{e}^{4x}$
	$\dfrac{(\ln x)(4\mathrm{e}^{4x}\tan x + \mathrm{e}^{4x}\sec^2 x) - \frac{1}{x}\mathrm{e}^{4x}\tan x}{(\ln x)^2}$	**M1**	**FT** *their* $4\mathrm{e}^{4x}\tan x + \mathrm{e}^{4x}\sec^2 x$
	Fully correct derivative, isw	**A1**	
	Alternative method for final two marks Applies correct product rule to $y = (\mathrm{e}^{4x}\tan x)(\ln x)^{-1}$ $\left(4\mathrm{e}^{4x}\tan x + \mathrm{e}^{4x}\sec^2 x\right)(\ln x)^{-1}$ $+\left(-(\ln x)^{-2}\left(\frac{1}{x}\right)\right)\left(\mathrm{e}^{4x}\tan x\right)$	**(M1)**	**FT** *their* $4\mathrm{e}^{4x}\tan x + \mathrm{e}^{4x}\sec^2 x$
	Fully correct derivative, isw	**(A1)**	
8(a)	$3(2\sin x\cos x) - (-2\sin x) \quad [=0]$ or better	**B2**	**B1** for the correct derivative for either term; may be unsimplified
	Factors out $\sin x$ and equates to 0: $[2](\sin x)(3\cos x + 1) = 0$ oe	**B1**	**FT** an expression of the form $a\sin x\cos x + b\sin x$ for non-zero constants a and b
	$\sin x = 0 \quad [\textit{theira}\cos x = -\textit{theirb}]$	**M1**	**FT** an expression of the form $a\sin x\cos x + b\sin x$ for non-zero constants a and b; **dep** on previous **B1**
	$x = \pi$ as only solution	**A1**	**dep** on all previous marks awarded If **B2 B0 M0** then **SC1** for dividing by $\sin x$ and using $\cos^{-1}\left(-\frac{1}{3}\right)$ to find $x = 1.91$ and 4.37 and clearly reject them.

Question	Answer	Marks	Partial Marks
8(b)	For use of $\sin^2 x = 1 - \cos^2 x$ to write in terms of cos$x$ only e.g. $3(1-\cos^2 x) - 2\cos x = 1 - 3\cos x$	**M1**	
	Collects terms e.g. $3\cos^2 x - \cos x - 2 = 0$	**A1**	
	Factorises the left-hand side or solves: $(3\cos x + 2)(\cos x - 1) = 0$	**M1**	
	$x = 2.3[0]$, $x = 3.98$ and no extras	**A2**	not from wrong working **A1** for either; not from wrong working
9(a)	[area sector =] $2 \times \frac{1}{2} a^2 \phi$ or $\frac{1}{2} a^2 (2\phi)$ oe	**B1**	or [area kite =] $2a^2\phi$ or [area OPT =] $a^2\phi$ nfww
	[shaded area =] $\left[2 \times \frac{1}{2} \times\right] \frac{1}{2} a(a\tan\phi)$ oe or $a(a\tan\phi) - \frac{1}{2} a^2 (2\phi)$ oe soi	**B1**	or $[a^2\phi = \frac{1}{2} a \times PT \therefore]$ $PT = 2a\phi$ **and** $PT = a\tan\phi$ oe, nfww
	Correct equation using correct areas e.g. $a^2\phi = \frac{1}{2} a(a\tan\phi)$ or $a(a\tan\phi) - a^2\phi = a^2\phi$ soi	**M1**	or equates expressions for PT
	Correct completion to given equation $\tan\phi = 2\phi$	**A1**	
	Alternative method [$\frac{1}{2}$ area sector =] $\frac{1}{2} a^2 \phi$	**(B1)**	
	[$\frac{1}{2}$ shaded area =] $\frac{1}{2} \times \frac{1}{2} a(a\tan\phi)$ oe or $\frac{1}{2} a(a\tan\phi) - \frac{1}{2} a^2\phi$ oe soi	**(B1)**	
	Correct equation using correct areas e.g. $\frac{1}{2} a^2\phi = \frac{1}{4} a(a\tan\phi)$ or $\frac{1}{2} a^2 \tan\phi - \frac{1}{2} a^2\phi = \frac{1}{2} a^2\phi$ soi	**(M1)**	
	Correct completion to given equation $\tan\phi = 2\phi$	**(A1)**	