4	Use correct product rule: $p\sin 4x\mathrm{e}^{\sin 2x} + q\cos 2x\cos 4x\mathrm{e}^{\sin 2x}$
	Obtain derivative $-4\sin 4x\mathrm{e}^{\sin 2x} + 2\cos 2x\cos 4x\mathrm{e}^{\sin 2x}$
	Equate derivative to zero and obtain an equation in one trig function
	Obtain $2\sin^2 2x + 4\sin 2x - 1 = 0$
	Obtain $x = 0.113$ and no other root

7	State $\dfrac{\mathrm{d}x}{\mathrm{d}t} = 2t - \dfrac{2}{2t+1}$
	Use correct quotient rule or correct product rule
	Obtain $\dfrac{\mathrm{d}y}{\mathrm{d}t} = \dfrac{(2t+1).1 - t(2)}{(2t+1)^2}$ oe
	Use $\dfrac{\mathrm{d}y}{\mathrm{d}x} = \dfrac{\mathrm{d}y}{\mathrm{d}t} \div \dfrac{\mathrm{d}x}{\mathrm{d}t}$
	Obtain answer $\dfrac{1}{2(2t+1)(2t-1)(t+1)}$
	Obtain $x = \left(\dfrac{y}{1-2y}\right)^2 - \ln\left(\dfrac{2y}{1-2y} + 1\right)$
	Use correct quotient rule to differentiate
	Obtain $\dfrac{\mathrm{d}x}{\mathrm{d}y} = \left(\dfrac{2y}{1-2y}\right)\left(\dfrac{(1-2y)+2y}{(1-2y)^2}\right) - \dfrac{2}{1-2y}$
	$\dfrac{\mathrm{d}y}{\mathrm{d}x} = \dfrac{\left(1-\frac{2t}{2t+1}\right)^3}{-2\left(1-\frac{4t}{2t+1}\right)\left(1-\frac{t}{2t+1}\right)} = \dfrac{1}{-2(2t+1)(1-2t)(t+1)}$
	Obtain answer $\dfrac{1}{2(2t+1)(2t-1)(t+1)}$

4	At $(\mathrm{e}, 3)$, $\tan t = 1$ or $t = \frac{\pi}{4}$
	$\frac{\mathrm{d}x}{\mathrm{d}t} = \sec^2 t \times \mathrm{e}^{\tan t}$
	$\frac{\mathrm{d}y}{\mathrm{d}t} = 6\tan t \times \sec^2 t$
	$\frac{\mathrm{d}y}{\mathrm{d}x} = \frac{6\tan t \times \sec^2 t}{\sec^2 t \times \mathrm{e}^{\tan t}}$ $\left(= 6\tan t \times \mathrm{e}^{-\tan t}\right)$
	$y - 3 = \frac{6}{e}(x - \mathrm{e})$
	$y = \frac{6}{\mathrm{e}}x - 3$
	Alternative Method for Question 4
	Correct cartesian form, e.g. $x = \mathrm{e}^{\sqrt{\frac{y}{3}}}$ or $\ln x = \sqrt{\frac{y}{3}}$ or $y = 3(\ln x)^2$
	Differentiate function of a function
	Obtain $\frac{\mathrm{d}x}{\mathrm{d}y} = k\sqrt{\frac{e}{y}}\mathrm{e}^{\sqrt{\frac{y}{3}}}$ or $\frac{\mathrm{d}y}{\mathrm{d}x} = k \times \frac{1}{x}\ln x$
	Obtain $\frac{\mathrm{d}x}{\mathrm{d}y} = \frac{1}{6}\sqrt{\frac{3}{y}}\mathrm{e}^{\sqrt{\frac{y}{3}}}$ or $\frac{\mathrm{d}y}{\mathrm{d}x} = 6 \times \frac{1}{x}\ln x$
	$y - 3 = \frac{6}{e}(x - \mathrm{e})$
4	$y = \frac{6}{\mathrm{e}}x - 3$

11(a)	$\frac{\mathrm{d}}{\mathrm{d}x}\sqrt{\sin 2x} = \frac{2\cos 2x}{2\sqrt{\sin 2x}}$ Accept $k\frac{\cos 2x}{\sqrt{\sin 2x}}$
	Use correct product rule
	Obtain correct derivative in any form
	Equate the derivative to zero and obtain a horizontal equation
	Use correct trig formulae to obtain an equation in one trig function
	Obtain $a = \frac{1}{6}\pi$
11(b)	Use $[\pi]\int y^2\,\mathrm{d}x$
	Use double angle formula to obtain a form that can be integrated directly, e.g. $\int \cos^2 x \sin 2x\,\mathrm{d}x = \int 2\cos^3 x \sin x\,\mathrm{d}x$
	Obtain $-(\pi)\times\frac{1}{2}\cos^4 x$
	Use correct limits correctly
	Obtain final answer $\frac{1}{2}\pi$

11(a)	Differentiate $\cos^2 x$ to obtain $-2\sin x\cos x$
	Use correct product rule
	Obtain derivative $-10\sin 2x\sin x\cos x + 10\cos 2x\cos^2 x$
	Equate derivative to zero and obtain an equation in one trig function
	Obtain $3\tan^2 x = 1$, $4\sin^2 x = 1$ or $4\cos^2 x = 3$ or $\cos 3x = 0$
	Obtain $x = \frac{1}{6}\pi$ only
	Alternative Method for the Question 11(a)
	Use double angle formula to obtain $y = 10\sin x\cos^3 x$
	Use correct product rule
	Obtain derivative $10\cos^4 x - 30\sin^2 x\cos^2 x$
	Equate derivative to zero and obtain an equation in one trig function
	Obtain $3\tan^2 x = 1$, $4\sin^2 x = 1$ or $4\cos^2 x = 3$ or $\cos 3x = 0$
	Obtain $x = \frac{1}{6}\pi$ only

11(a)	**Alternative Method 2 for the Question 11(a)**
	Use double angle formula to obtain $y = \frac{5}{2}\sin 2x(\cos 2x + 1)$
	Use double angle formula to obtain $y = \frac{5}{4}\sin 4x + \frac{5}{2}\sin 2x$
	Obtain derivative $5\cos 4x + 5\cos 2x$
	Equate derivative to zero and obtain an equation in $\cos 2x$
	Obtain $\cos 2x = \frac{1}{2}$ only
	Obtain $x = \frac{1}{6}\pi$ only

11(b)	$\dfrac{du}{dx} = -\sin x$
	Reach an integral of the form $\int Au^3\,du$
	Obtain $-10\int u^3 du$
	Substitute correct limits correctly in an expression of the form Cu^4 or $C\cos^4 x$
	Obtain answer $\dfrac{15}{8}$ or 1.875