6(a)	Attempt use of chain rule for differentiation of y or simplification of y and use of the product rule.
	Obtain $\frac{dx}{d\theta} = \sec^2\theta$ and $\frac{dy}{d\theta} = \cos\theta - 6\sin^2\theta\cos\theta$
	Attempt expression for $\frac{dy}{dx}$ in terms of $\cos\theta$ only using *their* $\frac{dx}{d\theta}$ and $\frac{dy}{d\theta}$
	Obtain $6\cos^5\theta - 5\cos^3\theta$
6(b)	Attempt solution of $y = 0$ to find value of θ
	Obtain $\sin^2\theta = \frac{1}{2}$ and hence $\theta = \frac{1}{4}\pi$
	Obtain gradient of curve at the point is $-\frac{1}{\sqrt{2}}$ or exact equivalent
	Attempt equation of normal using negative reciprocal for their gradient
	Obtain $y = \sqrt{2}x - \sqrt{2}$ or exact equivalent

8	Differentiate to obtain the form $k_1 e^{1-2x}(3x-1)^{\frac{1}{2}} + k_2 e^{1-2x}(3x-1)^{-\frac{1}{2}}$
	Obtain correct first term $-8e^{1-2x}(3x-1)^{\frac{1}{2}}$
	Obtain correct second term $+6e^{1-2x}(3x-1)^{-\frac{1}{2}}$
	Equate first derivative to zero and attempt solution as far as $3x-1=k$
	Obtain $3x-1=\frac{3}{4}$ OE, and hence $x=\frac{7}{12}$
	Obtain $y = 2\sqrt{3}e^{-\frac{1}{6}}$

5(a)	Differentiate to obtain $-8\sin 2x + 8\cos x$
	Attempt to solve equation of form $k_1 \sin 2x + k_2 \cos x = 0$ using correct identity
	Obtain at least $\sin x = \frac{1}{2}$
	Attempt to find both coordinates of at least one maximum point
	Obtain $\left(\frac{1}{6}\pi,\ 6\right)$ and $\left(\frac{5}{6}\pi,\ 6\right)$ and no others between 0 and π
5(b)	Integrate to obtain expression of form $k_1 \sin 2x + k_2 \cos x$
	Obtain correct $2\sin 2x - 8\cos x$
	Apply *their* x-limits correctly to evaluate area under curve between A and B
	Obtain $6\sqrt{3}$ or exact unsimplified equivalent
	Carry out correct process to find area of shaded region
	Obtain $6\left(\frac{5}{6}\pi - \frac{1}{6}\pi\right) - 6\sqrt{3}$, and hence $4\pi - 6\sqrt{3}$

7(a)	Attempt use of product rule for differentiating $5x^2y$
	Obtain $10xy+5x^2\dfrac{dy}{dx}$
	Differentiate $4e^{2y}$ and obtain $8e^{2y}\dfrac{dy}{dx}$
	Obtain $10xy+5x^2\dfrac{dy}{dx}+8e^{2y}\dfrac{dy}{dx}-7=0$ and hence $\dfrac{dy}{dx}=\dfrac{7-10xy}{5x^2+8e^{2y}}$
	Attempt to find relevant value of x and substitute that and $y=0$ to find gradient
	Obtain $x=2$ and gradient $\frac{1}{4}$
7(b)	Attempt to show that denominator of derivative cannot be zero
	State that both terms are non-negative or equivalent and conclude appropriately

1	Attempt use of product rule
	Obtain $6\cos(x^2+1)-12x^2\sin(x^2+1)$

4(a)	Differentiate to obtain $12e^{2x} - 3e^{3x}$
	Attempt solution for x of equation of form $k_1e^{2x} + k_2e^{3x} = 0$ (but not for $y = 0$), to obtain $e^{\pm x} = k$
	Obtain $x = \ln 4$ or $x = 2\ln 2$
4(b)	Identify $x = \ln 6$ as point where curve meets x-axis
	Integrate to obtain the form $k_3e^{2x} + k_4e^{3x}$
	Obtain $3e^{2x} - \frac{1}{3}e^{3x}$
	Apply limits to obtain answer $\frac{100}{3}$ only

6(a)	Attempt use of quotient rule (or equivalent) for derivative of x
	Obtain $\dfrac{5}{(3t+4)^2}$ or unsimplified equivalent
	Obtain $\dfrac{6}{3t+4}$ for derivative of y
	Attempt to express $\dfrac{dy}{dx}$ in terms of t
	Obtain $\frac{6}{5}(3t+4)$ stating or implying that $c=\frac{6}{5}$
6(b)	Attempt solution of $2\ln(3t+4)=\ln 100$
	Obtain $3t+4=10$ (or equivalent) and hence $t=2$ (only)
	Substitute to obtain $a=\frac{1}{2}$
	Substitute to obtain $m=12$
6(c)	State increasing, with reference to positive gradient

3	Attempt use of quotient rule (or equivalent) to differentiate $\dfrac{8x}{2x+3}$ or $\dfrac{-12x^2+15}{(2x+3)}$
	Obtain $\dfrac{dy}{dx}=\dfrac{24}{(2x+3)^2}-6$
	Equate first derivative to zero, and attempt solution of a quadratic equation to find two values of x
	Obtain at least one of the stationary points $(-\frac{5}{2},\ 30)$ and $(-\frac{1}{2},\ 6)$, or both x-values, $-\frac{5}{2}$ and $-\frac{1}{2}$
	Obtain both stationary points

6(a)	Substitute $y=e^{-1}$ in equation and simplify to quadratic equation in x
	Evaluate discriminant
	Obtain $-x^2+6x-11=0$, giving discriminant –8 and confirm result
6(b)	Attempt use of product rule for differentiation of $(x^2-3)\ln y$
	Obtain $2x\ln y+\dfrac{x^2-3}{y}\dfrac{dy}{dx}$
	Obtain complete $2x\ln y+\dfrac{x^2-3}{y}\dfrac{dy}{dx}+6=0$
	Substitute $x=2$ and $y=e^2$ to find value of gradient of tangent
	Obtain gradient $-14e^2$
	Obtain equation $y=-14e^2x+29e^2$ or equivalent of required form