Q	Marking instructions	AO	Marks	Typical solution
4(a)	Writes $\sqrt{x}$ as $x^{\frac{1}{2}}$ PI by derivative with $kx^{-\frac{1}{2}}$	1.1b	B1	$y=\frac{x^2}{8}+4x^{\frac{1}{2}}$ $\frac{dy}{dx}=\frac{x}{4}+2x^{-\frac{1}{2}}$
	Differentiates with at least one term correct	1.1a	M1	
	Obtains a correct expression for $\frac{\mathrm{d}y}{\mathrm{d}x}$ ACF ISW	1.1b	A1	
	Subtotal		**3**	

Q	Marking instructions	AO	Marks	Typical solution
4(b)	Obtains gradient of 2 or Substitutes x = 4 into their expression for $\frac{\mathrm{d}y}{\mathrm{d}x}$	1.1a	M1	$\frac{\mathrm{d}y}{\mathrm{d}x}=2$ $y-10=2(x-4)$
	Obtains correct equation of the tangent. Does not need to be fully simplified. ACF For example: $y=2x+2$ ISW	1.1b	A1	
	Subtotal		**2**	

Q	Marking instructions	AO	Marks	Typical solution
4(c)	Equates their $\frac{dy}{dx}$ to zero. OE	1.1a	M1	$\frac{x}{4}+2x^{-\frac{1}{2}}=0$ $\frac{x}{4}+\frac{2}{\sqrt{x}}=0$
	Completes reasoned argument by correctly manipulating the equation to obtain or $x^{\frac{3}{2}}=-8$ or $x^{\frac{1}{2}}=-2$ **and** states $x=4$ is a solution **and** then deduces $\frac{x}{4}+\frac{2}{\sqrt{x}}=2\neq 0$ or the gradient found at $x=4$ in part (b) was non-zero **and** concludes that the curve has no stationary points. or Completes reasoned argument by correctly manipulating the equation to obtain $x^2=-8\sqrt{x}$ or $x^{\frac{3}{2}}=-8$ or $x^{\frac{1}{2}}=-2$ **and** deduces the equation has no solutions by making explicit reference to $\sqrt{x}>0$ **and** concludes that the curve has no stationary points. or Completes reasoned argument to establish that $\frac{x}{4}+\frac{2}{\sqrt{x}}>0$ **and** deduces the equation has no solutions **and** concludes that the curve has no stationary points.	2.1	R1	As $x>0$, $\frac{2}{\sqrt{x}}>0$ and $\frac{x}{4}>0$ Therefore $\frac{x}{4}+\frac{2}{\sqrt{x}}>0$ Equation has no solutions so the curve has no stationary points.
	Subtotal		**2**	

	Question 4 Total		**7**	