Question	Scheme	Marks
4(a)	$y=\dfrac{5x^2+\sqrt{x^3}}{\sqrt[3]{8x}}=\dfrac{5x^2+x^{\frac{3}{2}}}{...x^{\frac{1}{3}}}$	M1
	$=\dfrac{5x^{2-\frac{1}{3}}}{2}+\dfrac{x^{\frac{3}{2}-\frac{1}{3}}}{2}$	M1
	$=\dfrac{5}{2}x^{\frac{5}{3}}+\dfrac{1}{2}x^{\frac{7}{6}}$	A1A1
		(4)
(b)	$\left(\dfrac{\mathrm{d}y}{\mathrm{d}x}=\right)...x^{\frac{2}{3}}+...x^{\frac{1}{6}}$	M1
	$\left(\dfrac{\mathrm{d}y}{\mathrm{d}x}=\right)\dfrac{25}{6}x^{\frac{2}{3}}+\dfrac{7}{12}x^{\frac{1}{6}}$	A1ftA1
		(3)
		(7 marks)

Notes:

(a)

M1: Converts the radicals into powers of x, with at least one power correct. E.g. $\sqrt{x^3}\rightarrow x^{\frac{3}{2}}$ or $\sqrt[3]{8x}\rightarrow ...x^{\frac{1}{3}}$

M1: Correct subtraction index law seen used at least once. May be implied.

It is for $\dfrac{5x^2}{\sqrt[3]{8x}}\rightarrow\dfrac{...x^2}{...x^p}\rightarrow ...x^{2-p}$ or $\dfrac{\sqrt{x^3}}{\sqrt[3]{8x}}\rightarrow\dfrac{...x^q}{...x^p}\rightarrow ...x^{q-p}$

Indices do **not** need to be processed for this mark.

A1: One term correct (coefficient and index) or both indices correct. E.g. $\dfrac{5}{2}x^{\frac{5}{3}}$ or $\dfrac{1}{2}x^{\frac{7}{6}}$ or $...x^{\frac{5}{3}}+...x^{\frac{7}{6}}$. **Depends on both M marks.**

A1: Fully correct expression in the required form. **Depends on all previous marks.**

$y=\ldots$ is not required. Apply isw once a correct expression is seen.

(b) **The $\dfrac{\mathrm{d}y}{\mathrm{d}x}=$ is not required throughout in part (b)**

M1: $x^n\rightarrow ...x^{n-1}$ for at least one term where $n\neq 1$.

A1ft: Correct differentiation of one of their terms where $n\neq 1$.

Follow through their part (a). But not for $kx\rightarrow k$

May be unsimplified.

Depends on both M marks in part (a).

A1: Correct derivative, with terms in simplest form. Apply isw once a correct expression is seen.

Score A0 if they include "+ c"

Question	Scheme	Marks
5(a)	$\angle AOB = \cos^{-1}\dfrac{1.5}{4} = ...$ or $\angle AOB = \tan^{-1}\dfrac{\sqrt{4^2-1.5^2}}{1.5} = ...$ or $\angle AOB = \dfrac{\pi}{2} - \sin^{-1}\dfrac{1.5}{4} = \ldots$ or $\angle AOB = \dfrac{\pi}{2} - \tan^{-1}\dfrac{1.5}{\sqrt{4^2-1.5^2}} = ...$	**M1**
	= 1.186 *	**A1***
		(2)
(b)	$l = 4\times 1.186\left(= 4.744\right)$	**M1**
	$BC = 6 - 4\sin 1.186\left(= 6 - 3.708... = 2.29...\right)$ or $BC = 6 - 4\cos\left(\dfrac{\pi}{2} - 1.186\right)\left(= 6 - 3.708... = 2.29...\right)$ or $BC = 6 - \sqrt{4^2-1.5^2}\left(= 6 - 3.708... = 2.29...\right)\left(= \dfrac{12-\sqrt{55}}{2}\right)$ or $BC = 6 - \dfrac{1.5}{\tan"0.384"}\left(= 6 - 3.708... = 2.29...\right)$	**M1**
	Perimeter is $4\times 1.186... + \left(6 - 4\cos 0.384...\right) + 1.5 + 6 + 4 = ..$	**ddM1**
	= awrt 18.5 (m)	**A1**
		(4)
(c)	Area sector = $\dfrac{1}{2}\times 4^2 \times 1.186...$	**M1**
	Area *OBCD* Examples: $6\times 1.5 - \dfrac{1}{2}\times"3.708"\times 1.5$ or $\left(6-"3.708"\right)\times 1.5 + \dfrac{1}{2}\times"3.708"\times 1.5$ or $\dfrac{1}{2}\left(6+6-"3.708"\right)\times 1.5$ or $6\times 1.5 - \dfrac{1}{2}\times 1.5\times 4\sin 1.186$ or $\dfrac{1}{2}\times 6\times 1.5 + \dfrac{1}{2}\left(6-"3.708"\right)\times 1.5$ (= 6.219…)	**M1** **A1 on EPEN**
	$\dfrac{1}{2}\times 4^2 \times 1.186 + 6.219... =$	**ddM1**
	= awrt 15.7 (m^2)	**A1**
		(4)
		(10 marks)