Question Number	Scheme	Marks
2a	$\frac{1}{8}x$	B1
		(1)
b	$\frac{1}{256}x^{\frac{3}{2}}$	B1
		(1)
c	$\left(\frac{1}{2}\left(\frac{1}{64}x^2\times\frac{16}{\sqrt{x}}\right)\right)^{-\frac{4}{3}}=\left(\frac{1}{8}x^{\frac{3}{2}}\right)^{-\frac{4}{3}}=16x^{-2}$	M1A1
		(2)
		(4 marks)

(a)

B1: $\frac{1}{8}x$ or simplified equivalent e.g. $0.125x$ or $\frac{1}{8}x^1$ Accept e.g. $\frac{x}{8}$ but $\pm\frac{1}{8}x$ is B0.

Do not withhold this mark unless it is clear that they intend to write $\frac{1}{8x}$

(b)

B1: $\frac{1}{256}x^{\frac{3}{2}}$ or simplified equivalent e.g. $0.00390625x^{\frac{3}{2}}$ condone $\frac{x^{\frac{3}{2}}}{256}$. Isw after a correct answer is seen.

Do not accept e.g. $\frac{1}{256}\sqrt{x^3}$ or $\frac{1}{256}\left(\sqrt{x}\right)^3$ or $\frac{1}{256}x\sqrt{x}$ as n is not a simplified constant.

Do not accept $x^{\frac{3}{2}}\div 256$ or $\frac{1}{256x^{-\frac{3}{2}}}$ (not of the required form)

Do not withhold this mark unless it is clear that they intend to write $\frac{1}{256x^{\frac{3}{2}}}$

(c)

M1: Attempts to use the index laws and proceeds to either

- $\left(...x^{\frac{3}{2}}\right)^{-\frac{4}{3}}$ or $\left(...x^{-\frac{3}{2}}\right)^{\frac{4}{3}}$
- $...x^{-\frac{8}{3}}\times...x^{\frac{2}{3}}$ (or $...x^{-\frac{8}{3}}\div...x^{-\frac{2}{3}}$)
- $...x^{-2}$
- $16x^n$ where $n\neq-\frac{1}{2}$

Allow $\frac{16}{x^2}$ to score M1.

Be aware that incorrect understanding of indices such as $\frac{16}{\sqrt{x}}=16x^{-2}$ is M0A0

A1: $16x^{-2}$ (from a correct method)
(Correct answer with no incorrect working seen can score M1A1). Isw after a correct answer is seen. $\frac{16}{x^2}$ is A0

Question Number	Scheme	Marks
3a	$\dfrac{8-\sqrt{15}}{2\sqrt{3}+\sqrt{5}}\times\dfrac{2\sqrt{3}-\sqrt{5}}{2\sqrt{3}-\sqrt{5}}=\dfrac{16\sqrt{3}-8\sqrt{5}-2\sqrt{45}+\sqrt{75}}{12-5}$	M1
	e.g. $\dfrac{21\sqrt{3}-14\sqrt{5}}{7}$	dM1
	$3\sqrt{3}-2\sqrt{5}$	A1
		(3)
b	$\left(x+5\sqrt{3}\right)\sqrt{5}=40-2x\sqrt{3}\Rightarrow x\sqrt{5}+2x\sqrt{3}=40-5\sqrt{15}$	M1
	$\left(x=\right)\dfrac{40-5\sqrt{15}}{2\sqrt{3}+\sqrt{5}}$	A1
	$\left(x=\right)15\sqrt{3}-10\sqrt{5}$	A1ft
		(3)
		(6 marks)

(a) Note that $3\sqrt{3}-2\sqrt{5}$ with no working scores M0dM0A0

M1: Attempts to rationalise the denominator by multiplying both numerator and denominator by $k\left(2\sqrt{3}-\sqrt{5}\right)$, where k is an integer usually 1, and proceeds to a fraction such as $\dfrac{...\sqrt{3}\pm...\sqrt{5}\pm...\sqrt{45}\pm...\sqrt{75}}{...}$ or $\dfrac{...}{12-5}$ or $\dfrac{...}{7}$

but not for e.g. $\dfrac{...}{12+2\sqrt{15}-2\sqrt{15}-5}$ or $\dfrac{...}{\left(2\sqrt{3}\right)^2-\left(\sqrt{5}\right)^2}$ as these still have surds on the denominator.

Allow $\sqrt{45}$ and $\sqrt{75}$ to be written in terms of $\sqrt{3}$ and $\sqrt{5}$ as well.
Condone slips in multiplying out as well as miscopying errors.

Note $\dfrac{21\sqrt{3}-14\sqrt{5}}{7}$ with no intermediate working can still score M1 for the denominator.

Attempting to multiply by a multiple of $\dfrac{2\sqrt{3}+\sqrt{5}}{2\sqrt{3}+\sqrt{5}}$ is M0dM0A0

dM1: Attempts to simplify surds and may collect terms to achieve a fraction where

- the numerator is in terms of $\sqrt{3}$ and $\sqrt{5}$ only.
- the denominator is a multiple of 7 (which may be unsimplified)

It is dependent on the previous method mark.
If they have not fully multiplied out the numerator (or implied) then this mark cannot be scored. e.g.
$\dfrac{(8-\sqrt{15})(2\sqrt{3}-\sqrt{5})}{...}=\dfrac{16\sqrt{3}+8\sqrt{5}}{...}$ scores a maximum of M1dM0A0.

Note $\dfrac{21\sqrt{3}-14\sqrt{5}}{7}$ **with no previous working seen** scores M1dM0A0 because they have not shown any multiplying out of the brackets on the numerator.

Note $\dfrac{8-\sqrt{15}}{2\sqrt{3}+\sqrt{5}}=\dfrac{16\sqrt{3}-8\sqrt{5}-2\sqrt{45}+\sqrt{75}}{7}=3\sqrt{3}-2\sqrt{5}$ is M1dM0A0 because they have not collected terms on the numerator (or changed them all to be in terms of $\sqrt{3}$ and $\sqrt{5}$ before simplifying to the final answer).