Question Number	Scheme	Marks
1(a)	$4(x-5)<2x-9 \Rightarrow 4x-20<2x-9 \Rightarrow x<...$	M1
	$\Rightarrow x<\frac{11}{2}$	A1
		(2)
(b)	$2x^2-5x-63=0 \Rightarrow (2x+9)(x-7)=0 \Rightarrow x=-\frac{9}{2},7$	M1
	$-\frac{9}{2}\leqslant x\leqslant 7$	**d**M1 A1
		(3)
(c)	$-\frac{9}{2}\leqslant x<\frac{11}{2}$	B1
		(1)
		(6 marks)

Notes

(a)

M1: Attempts to expand the brackets or e.g. divide by 4, collect terms and proceeds to $x\square...$ where $\square$ is any inequality or "=".

A1: $x<\frac{11}{2}$ oe e.g. $x<5.5, (-\infty, 5.5)$ Apply isw once a correct answer is seen.

(b)

M1: Multiplies out the brackets, rearranges and attempts to solve a 3TQ by any **non-calculator** means. Apply the general guidance for solving a 3TQ by factorisation, formula or completing the square. If roots are just written down, this scores M0

Note that e.g. $2x^2-5x-63=0 \Rightarrow x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=-\frac{9}{2},7$ scores M0

But $2x^2-5x-63=0 \Rightarrow x=\frac{5\pm\sqrt{5^2-4(-63)(2)}}{2\times 2}$ or $\frac{5\pm 23}{4}=-\frac{9}{2},7$ scores M1

dM1: Chooses the inside region for their critical values found via a non-calculator method.

Condone strict inequalities e.g. $-\frac{9}{2}<x<7$ or e.g. $x>-\frac{9}{2}$, $x<7$

Depends on the previous mark.

A1: $-\frac{9}{2}\leqslant x\leqslant 7$ Allow "$x\geqslant -\frac{9}{2}$ **and** $x\leqslant 7$" or $\left[-\frac{9}{2},\ 7\right]$ or $7\geqslant x\geqslant -\frac{9}{2}$

but **not** "$x\geqslant -\frac{9}{2}$ or $x\leqslant 7$" and not "$x\geqslant -\frac{9}{2},\ x\leqslant 7$"

Apply isw once a correct answer is seen but there must be no contradictory inequalities.

(c)

B1: $-\frac{9}{2}\leqslant x<\frac{11}{2}$ Allow "$x\geqslant -\frac{9}{2}$ **and** $x<\frac{11}{2}$" or $\left[-\frac{9}{2},\ \frac{11}{2}\right)$ or $\frac{11}{2}>x\geqslant -\frac{9}{2}$

but **not** "$x\geqslant -\frac{9}{2}$ or $x<\frac{11}{2}$" and not "$x\geqslant -\frac{9}{2}, x<\frac{11}{2}$"

Apply isw once a correct answer is seen but there must be no extra inequalities.

Question Number	Scheme	Marks
2(i)	Uses a correct law of indices on 4^{2y+1} or 32^{4y} The possibilities are endless but some more common examples are: **For** 4^{2y+1}**:** $4^{2y}\times 4,\quad 2^{2(2y+1)},\quad \left(2^2\right)^{2y}\times 2^2$ **For** 32^{4y}**:** $\left(2^5\right)^{4y},\quad 2^{5\times 4y},\quad 2^{20y},\quad \left(4^{\frac{5}{2}}\right)^{4y},\quad 4^{10y}$	M1
	e.g. $2^{4y+2}=\dfrac{2^{20y}}{2}\Rightarrow 2^{4y+3}=2^{20y}\Rightarrow 4y+3=20y\Rightarrow y=...$ or e.g. $4^{2y+1}=\dfrac{4^{10y}}{2}\Rightarrow 4^{2y+1}=4^{10y-\frac{1}{2}}\Rightarrow 2y+1=10y-\dfrac{1}{2}\Rightarrow y=...$	**d**M1
	$y=\dfrac{3}{16}$	A1
		(3)

(i) Notes

This part of the question can be solved in many different ways.
If you are unsure if a particular approach deserves credit, seek advice from your TL

M1: This is effectively a B mark and is for applying a correct law of indices on 4^{2y+1} or 32^{4y}
This may be seen in isolation i.e. not necessarily within the equation but not just e.g. $4=2^2$
See scheme for some examples.

dM1: Reaches a value for y condoning arithmetic slips but with no incorrect index work e.g.
$2\times 4^{2y}=8^{2y}$ or e.g. $\dfrac{4^{10y}}{2}=2^{10y}$ or e.g. $\dfrac{32^{4y}}{2}=16^{4y}$
See main scheme for examples of acceptable work.
See also supplementary document for some example responses with marks.
Depends on the first method mark.

A1: Fully correct work leading to $y=\dfrac{3}{16}$ oe e.g. $y=\dfrac{6}{32}$ or 0.1875 following award of both Method marks.

Correct answers with no working in (i) score no marks.

See extra document for some examples.

(ii)	$x\sqrt{27}+21=\dfrac{6x}{\sqrt{3}}$	
	E.g. $\sqrt{27}=3\sqrt{3}$, $\dfrac{6}{\sqrt{3}}=\dfrac{6\sqrt{3}}{3}$ or $2\sqrt{3}$, $\sqrt{27}\times\sqrt{3}=9$	B1
	$\left(3\sqrt{3}-2\sqrt{3}\right)x=-21$ or e.g. $3x=-21\sqrt{3}$	M1
	$x=-\dfrac{21}{\sqrt{3}}=-7\sqrt{3}$	**d**M1 A1
		(4)
		(7 marks)

(ii) Notes

B1: Correct surd work seen. E.g. $\sqrt{27}=3\sqrt{3}$, $\dfrac{6}{\sqrt{3}}=\dfrac{6\sqrt{3}}{3}$ or $2\sqrt{3}$, $\sqrt{27}\times\sqrt{3}=9$

M1: Attempts to collect terms in x

dM1: Attempts to write the answer in the form $a\sqrt{b}$ where $\sqrt{b}$ is irrational.
Depends on the previous method mark.

A1: cso $x=-7\sqrt{3}$

Correct answers with no working in (ii) score no marks.