Question Number	Scheme	Marks
2(a)	$R = \sqrt{5}$	B1
	$\tan\alpha = \frac{2}{1} \Rightarrow \alpha = ...$	M1
	$\alpha = 1.107$	A1
		(3)
(b)(i)	$\text{Max} = 3 + 7\sqrt{5}$	B1ft
(b)(ii)	$(2x - "1.107") = \pi \Rightarrow x = ...$	M1
	$\Rightarrow x = \frac{\pi + "1.107"}{2} = 2.12$	A1
		(3)
		Total 6

(a)

B1: Correct exact value (Condone $R = \pm\sqrt{5}$).

isw after a correct answer. e.g. $R = \sqrt{5} = 2.24$

M1: Allow for: $\tan\alpha = \pm\frac{2}{1}$, $\tan\alpha = \pm\frac{1}{2}$, $\cos\alpha = \pm\frac{1}{"R"}$, $\sin\alpha = \pm\frac{2}{"R"}$ leading to a value for α

If no method is shown imply by the sight of awrt 1.1 rads or awrt $63°$

A1: awrt 1.107

(b)(i)

B1ft: Award for 3 + 7×their R where $R > 0$.

Also follow through on decimal answers from (a) e.g.

Condone solutions such as $3 - 7 \times -\sqrt{5} = 18.65..$.

(b)(ii)

M1: For an attempt to solve $(2x \pm "1.107") = \pi$ or $(2x \pm "1.107") = -\pi$. May be implied by awrt 2.12

Condone a bracketing slip $\cos(2(x \pm "1.107")) = -1 \Rightarrow 2(x \pm "1.107") = \pi \Rightarrow x = ...$ (condone $-\pi$ as above)

Also condone an attempt to solve $(2x \pm "63°") = 180°$ but not mixed units, e.g. $(2x \pm "1.107") = 180°$

A1: For awrt 2.12. This cannot be given in a list, the 2.12 must be selected.

Question Number	Scheme	Marks
3(a)	$\log_{10} y = \frac{5}{16}x + 1.5$	M1A1
		(2)
(b)	$\log_{10} y = "\frac{5}{16}"x + "1.5" \Rightarrow y = 10^{"\frac{5}{16}"x + "1.5"}$	M1
	$\Rightarrow y = 10^{"\frac{5}{16}"x} \times 10^{"1.5"}$	M1
	$y = 31.6 \times 2.05^x$	A1
		(3)
		Total 5

(a)

M1: Scored for a complete attempt to get the equation of the line condoning $\log_{10} y \leftrightarrow y \leftrightarrow l$ and an incorrect sign on the gradient. So, allow for $(\log_{10} y) = \pm\frac{1.5}{4.8}x + 1.5$ o.e. and for $\frac{y-0}{x+4.8} = \pm\frac{1.5}{4.8}$

If this is attempted via simultaneous equations the mark is scored when the candidate reaches $m = \pm 0.3125$ $c = 1.5$

A1: Correct equation. e.g. $\log_{10} y = \frac{5}{16}x + 1.5$ or equivalent such as $16\log_{10} y = 5x + 24$

The $\log_{10}$ must not appear as "ln" but allow as "log" or "lg"

(b)

Main Method: Starting with their $\log_{10} y = mx + c$

M1: "Removes" the logs in their equation. e.g. $\log_{10} y = "m"x + "c" \Rightarrow y = 10^{"m"x + "c"}$

M1: "Correct" strategy to obtain values of *k* and *b* or else proceeding correctly to a form $y = 10^{"\frac{5}{16}"x} \times 10^{"1.5"}$

Allow for $k = 10^{"1.5"} (= 31.6)$ and $b = 10^{"\frac{5}{16}"} = (2.05)$. Note that you may see $10^{1.5}$ as $10\sqrt{10}$

A1: Correct equation produced, $y = 31.6 \times 2.05^x$, and no errors seen.

Condone correct working followed by $k = 31.6, b = 2.05$ with the equation being implied

cso ....the values must be 31.6 and 2.05, not values rounding to these numbers or exact values like $10\sqrt{10}$.

Note: A solution may be fudged from working similar to the following

$\log_{10} y = mx + c \Rightarrow y = 10^{mx} + 10^{c} \Rightarrow y = 31.6 + 2.05^x \Rightarrow y = 31.6 \times 2.05^x$

This will score Special case: M0 M1 A0

Alternative Method: Starting with $y = kb^x$

M1: Takes logs of both sides and applies at least one correct log law

e.g. $\log_{(10)} kb^x = \log_{(10)} k + \log_{(10)} b^x$, $\log_{(10)} b^x = x\log_{(10)} b$

M1: "Correct" strategy to obtain values for *k* and *b* from their $y = mx + c$

So $\log_{10} k = "c" \Rightarrow k = 10^{c}$ and $\log_{10} b = "m" \Rightarrow b = 10^{m}$