

Question	Scheme	Marks	AOs
2(a)	$f(1.1) = -0.379... \quad f(1.2) = 0.655...$	M1	1.1b
	Change of sign and function is continuous in the interval $\Rightarrow$ root in $[1.1, 1.2]$ *	A1*	2.4
		(2)	
(b)(i)	$(x_2 =) \frac{1 + \ln(7 - 3(1.1))}{2} = ...$	M1	1.1b
	$(x_2 =) \text{awrt } 1.1542$	A1	1.1b
	(ii) $(\alpha =) 1.1384$	B1cao	2.2a
		(3)	

(5 marks)

Notes

(a)	M1: Attempts both $f(1.1)$ and $f(1.2)$ and obtains at least one correct to 1 significant figure or allow truncated to one decimal place. May use a narrower interval which you will need to check the value(s) on your calculator. A1*: Completes the argument Requires $f(1.1)$ and $f(1.2)$ correct to 1 significant figure or allow truncated to one decimal place (or their two allowable values if a narrower interval is used) - a full reason including “change of sign” oe and “continuity” oe. Accept equivalent statements for sign change e.g. $f(1.1) \times f(1.2) < 0$ or e.g. $f(1.1) < 0, f(1.2) > 0$ - a minimal conclusion e.g. root, tick, α lies in the interval oe Accept as a minimum, "change of sign, continuous, root" and mark positively their explanation. Condone “the graph is continuous” and condone reference to x instead of α Do not condone “change of sign, therefore continuous” or other incorrect statements such as e.g. “because x is continuous”, or “the interval is continuous”
(b)(i)	Check by the question. If there is a contradiction between answers, the answer in the main body of the script takes precedence. M1: Attempts to use the iterative formula with $x_1 = 1.1$ The value embedded in the formula is sufficient. May be implied by awrt 1.15 or awrt 1.132 provided no incorrect working is seen. Candidates sometimes find x_3 (or possibly subsequent terms) rather than x_2 in which case the M1 can be implied. (See table on the next page for the first few iterations) A1: awrt 1.1542 M1A1 is scored for sight of 1.1542 so we can ignore any labelling.

(ii)

B1cao: ($\alpha =$) 1.1384 (4dp) Must be this value and **not** awrt 1.1384 but isw if they then round to 3sf. If the candidate lists their iterations but does not select an answer then take the final value, which still requires the answer to be given to 4dp.

Note that awrt 1.1384 does not imply M1

For reference:

x_1	1.1
x_2	1.15416641
x_3	1.1317101024
x_4	1.141142755
...	...
α	1.138365696