

CS 3113 A2

1) a) $x^3 + x^2 - 3x - 3$ $[1, 2]$, $r = \sqrt{3}$

$$f(1) = (1)^3 + (1)^2 - 3(1) - 3 = -4$$

$$f(2) = (2)^3 + (2)^2 - 3(2) - 3 = 3$$

Assuming f is a continuous function on $[1, 2]$ & y is between -4 & 3 , then there exists a number c that is $1 \leq c \leq 2$ such that $f(c) = y$

iter	bracket	c	sign(f)	error bound
0	$[1, 2]$	1.5	< 0	0.5
1	$[1.5, 2]$	1.75	> 0	0.25
2	$[1.5, 1.75]$	1.625	< 0	0.125
3	$[1.625, 1.75]$	1.6875	< 0	0.0625
4	$[1.6875, 1.75]$	1.71875	< 0	0.03125

iter	absolute error
0	0.23205
1	0.1794
2	0.10705
3	0.04455
4	0.01330

b) $F(x) = 1 - \ln x$ $[2, 3]$, $r = e$

$$f(2) = 1 - \ln(2) = 0.30685$$

$$f(3) = 1 - \ln(3) = -0.09861$$

Assuming f is a continuous function on $[2, 3]$ & y is between 0.30685 & -0.09861 , then there exists a number c that is $2 \leq c \leq 3$ such that $f(c) = y$

②

iter	bracket	c	sign(f)	error bound
0	[2,3]	2.5	>0	0.5
1	[2.5,3]	2.75	<0	0.25
2	[2.5,2.75]	2.625	>0	0.125
3	[2.625,2.75]	2.6875	>0	0.0625
4	[2.6875,2.75]	2.71875	<0	0.03125

iter	absolute error
0	0.2183
1	0.0317
2	0.0933
3	0.0308
4	0.00047