

Solution of problem – 1

1 (a)

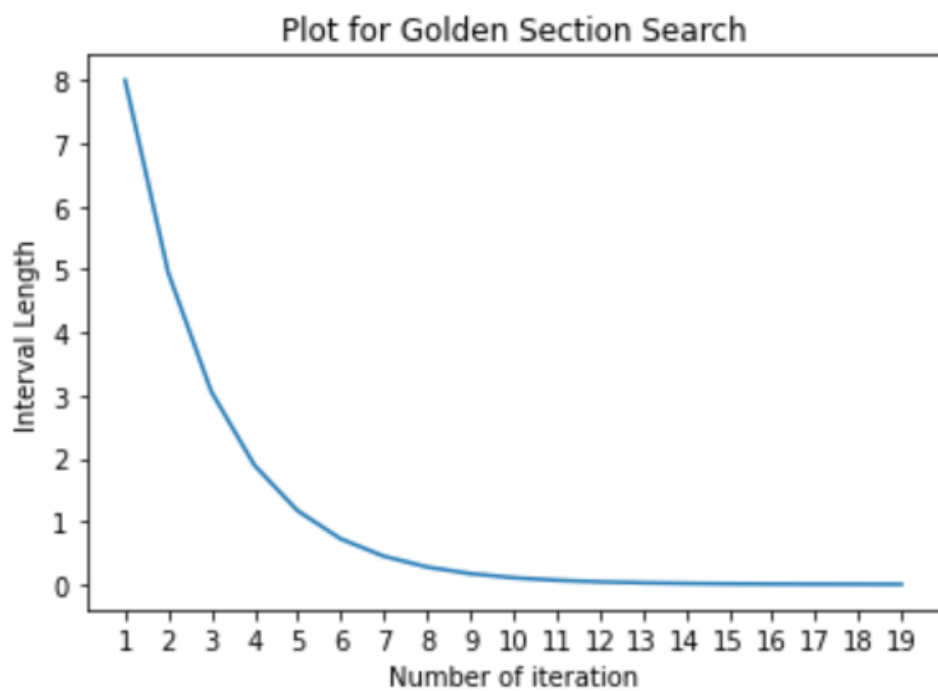
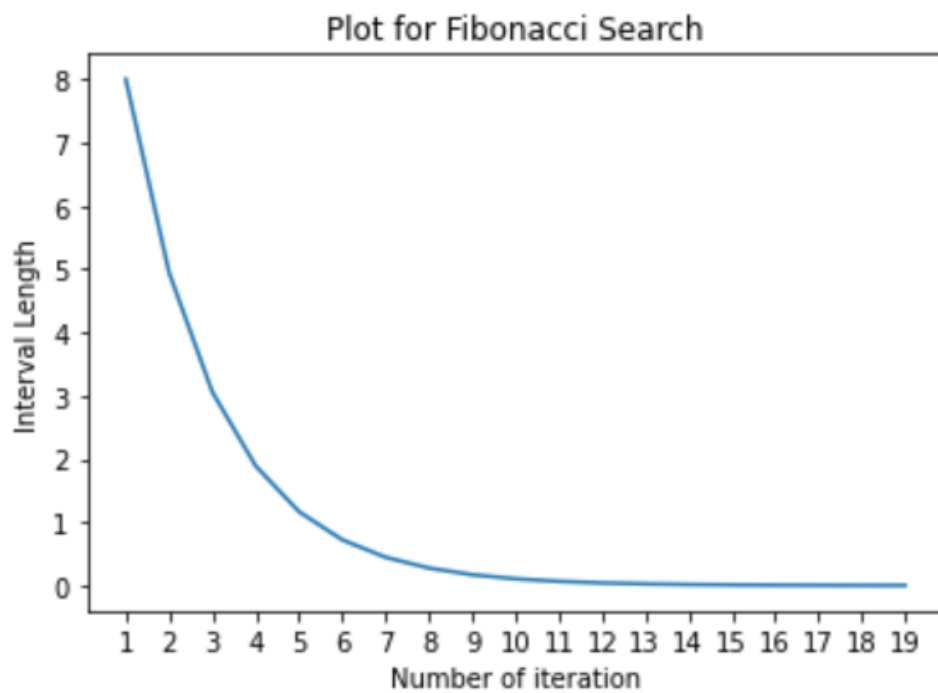
Table for Golden Section Search method:

	a_k	b_k	lambda	mu	f(lambda)	f(mu)
1	-3.000000	5.000000	0.055728	1.944272	0.114562	7.668737
2	-3.000000	1.944272	-1.111456	0.055728	-0.987578	0.114562
3	-3.000000	0.055728	-1.832816	-1.111456	-0.306418	-0.987578
4	0.055728	-1.832816	-0.665631	-1.111456	-0.888198	-0.987578
5	-1.832816	-0.665631	-1.386991	-1.111456	-0.850238	-0.987578
6	-0.665631	-1.386991	-0.941166	-1.111456	-0.996539	-0.987578
7	-0.665631	-1.111456	-0.835921	-0.941166	-0.973078	-0.996539
8	-1.111456	-0.835921	-1.006211	-0.941166	-0.999961	-0.996539
9	-1.111456	-0.941166	-1.046412	-1.006211	-0.997846	-0.999961

Table for Fibonacci Search Method:

	a_k	b_k	lambda	mu	f(lambda)	f(mu)
1	-3.000000	5.000000	0.055728	1.944272	0.114562	7.668737
2	-3.000000	1.944272	-1.111456	0.055728	-0.987578	0.114562
3	-3.000000	0.055728	-1.832816	-1.111456	-0.306418	-0.987578
4	0.055728	-1.832816	-0.665631	-1.111456	-0.888198	-0.987578
5	-1.832816	-0.665631	-1.386991	-1.111456	-0.850238	-0.987578
6	-0.665631	-1.386991	-0.941166	-1.111456	-0.996539	-0.987578
7	-0.665631	-1.111456	-0.835921	-0.941166	-0.973078	-0.996539
8	-1.111456	-0.835921	-1.006211	-0.941166	-0.999961	-0.996539
9	-1.111456	-0.941166	-1.046411	-1.006211	-0.997846	-0.999961

1 (b)



From the above we clearly see that both the search functions are almost equally efficient and asymptotically identical.

1 (c)

Manually we get the optimum value

-0.9999182873019831

By SciPy package optimizer we get the optimum value

-0.9999999987444217

They don't have any significant difference.

Solution of problem – 2

Based on the given Wolfe conditions , we can conclude that the co-ordinates of the optimal solution is (0,1).