

# Lab 03

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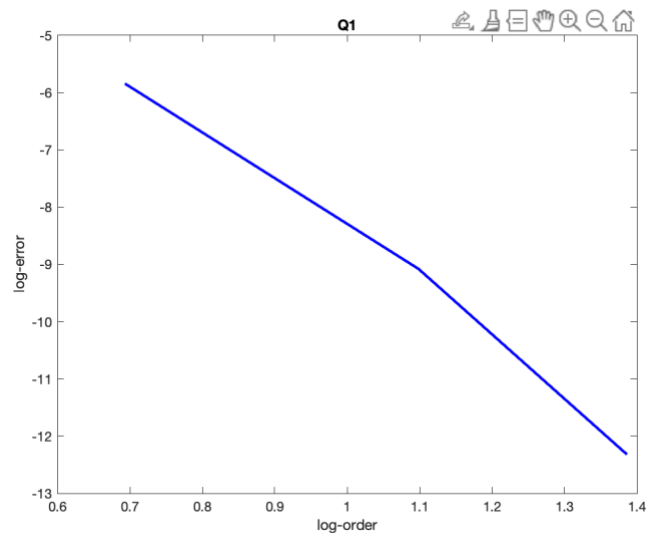
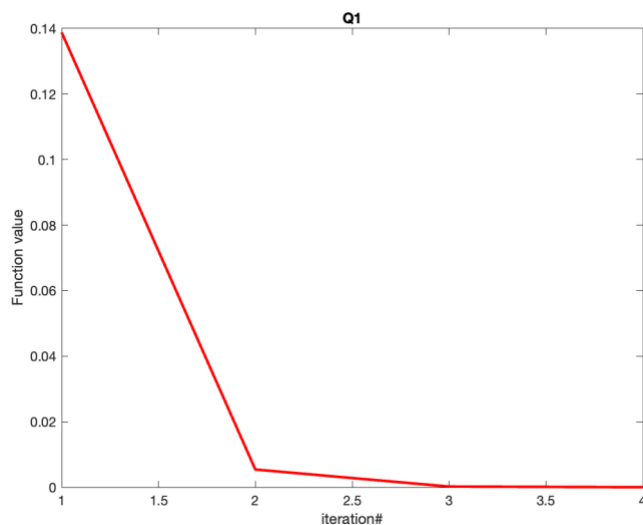
**Q1) Fixed point method:****Approx solution 1.855585 at iteration 4.**

Iteration#	Approx. Sol.	Error
1	1.861210e+00	1.387903e-01
2	1.855805e+00	5.405121e-03
3	1.855593e+00	2.114574e-04
4	1.855585e+00	8.274039e-06

Function chosen:

$$g(x) = (x + 10)^{\frac{1}{4}}$$

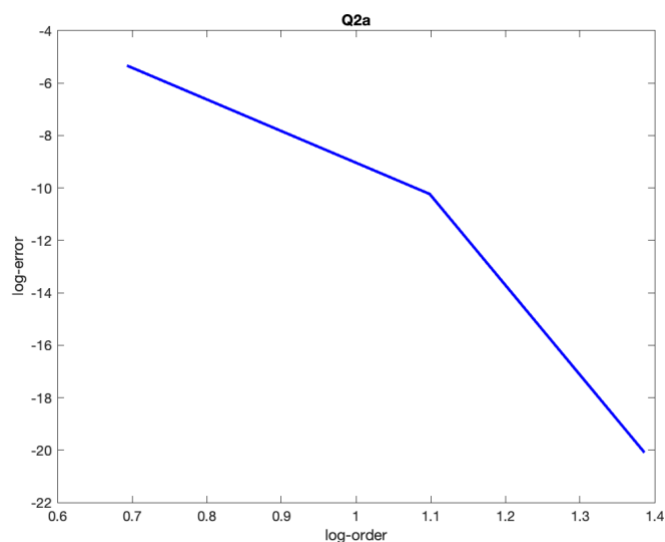
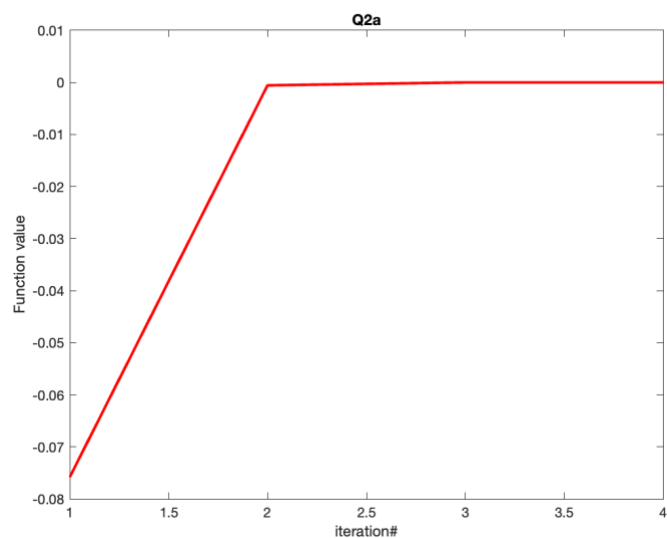
Initial point: 2



Q2a) Modified Newton method:  
Solution found at iteration 4: 1.648095e+00

Iteration#	Approx. Sol.	Error
1	1.656165e+00	1.561651e-01
2	1.648155e+00	8.010364e-03
3	1.648095e+00	5.939532e-05
4	1.648095e+00	3.094406e-09

Initial point: 1.5

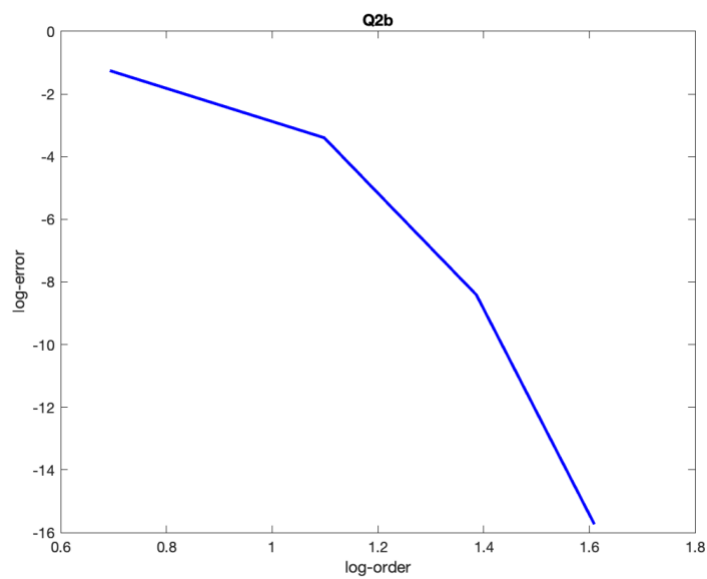
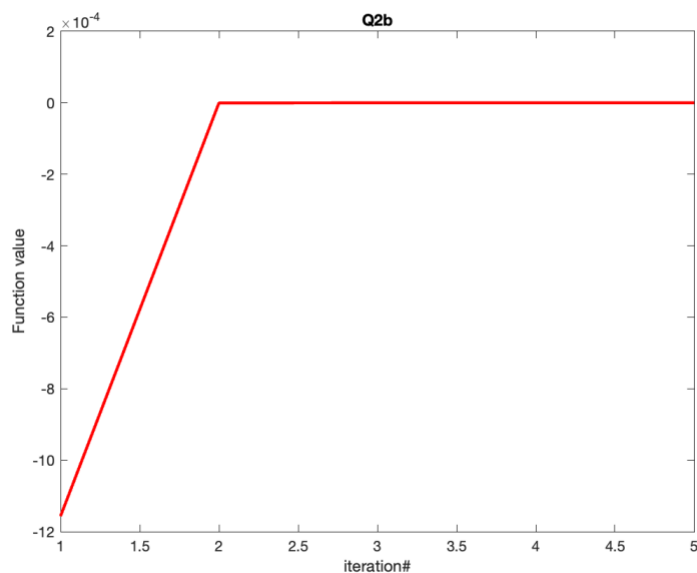


## Q2b) Modified Newton method:

Solution found at iteration 5:  $-1.832564e-01$

Iteration#	Approx. Sol.	Error
1	$-2.653689e-01$	$2.346311e-01$
2	$-1.896445e-01$	$7.572443e-02$
3	$-1.832971e-01$	$6.347399e-03$
4	$-1.832564e-01$	$4.068759e-05$
5	$-1.832564e-01$	$2.682117e-08$

Initial point: -0.5

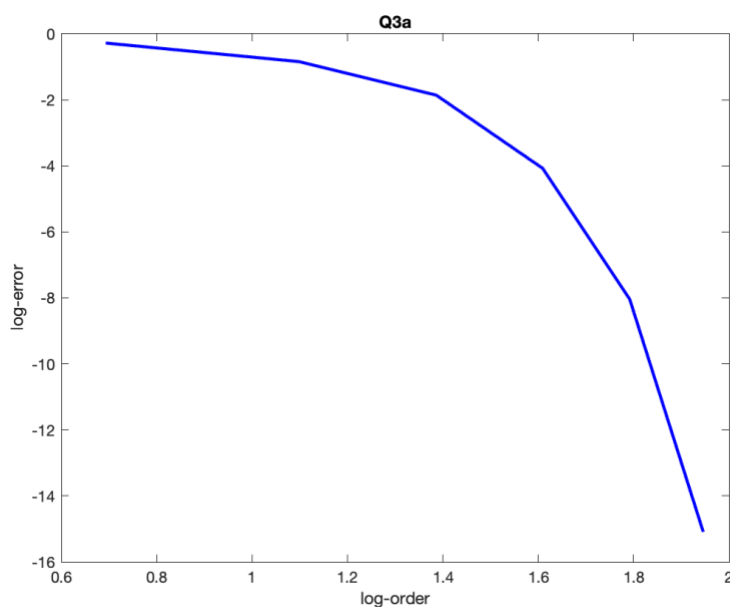
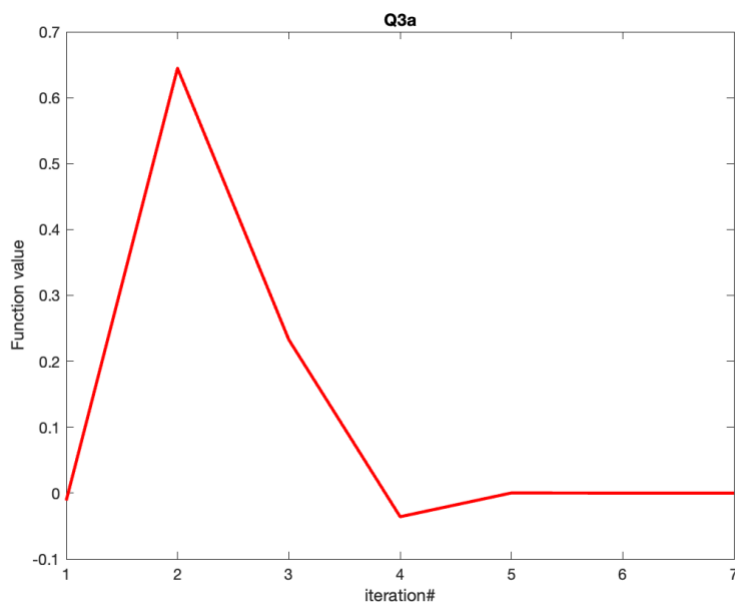


### Q3a) Muller method:

Solution found at iteration 7:  $-3.390928e-01 + i4.466301e-01$

Iteration#	Approx. Sol.	Error
1	$-1.000000e-01 + i8.888194e-01$	$1.072381e+00$
2	$-2.880152e-01 + i2.382530e-01$	$6.771900e-01$
3	$-3.744124e-01 + i3.742351e-01$	$1.611074e-01$
4	$-3.470404e-01 + i4.521998e-01$	$8.263001e-02$
5	$-3.392167e-01 + i4.464985e-01$	$9.680636e-03$
6	$-3.390930e-01 + i4.466301e-01$	$1.806506e-04$
7	$-3.390928e-01 + i4.466301e-01$	$1.569372e-07$

Initial points: -0.5, 0, 0.5

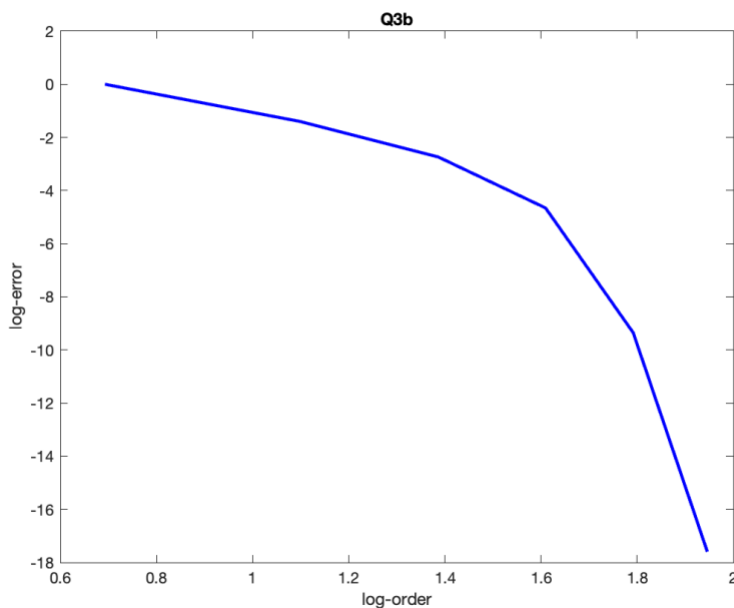
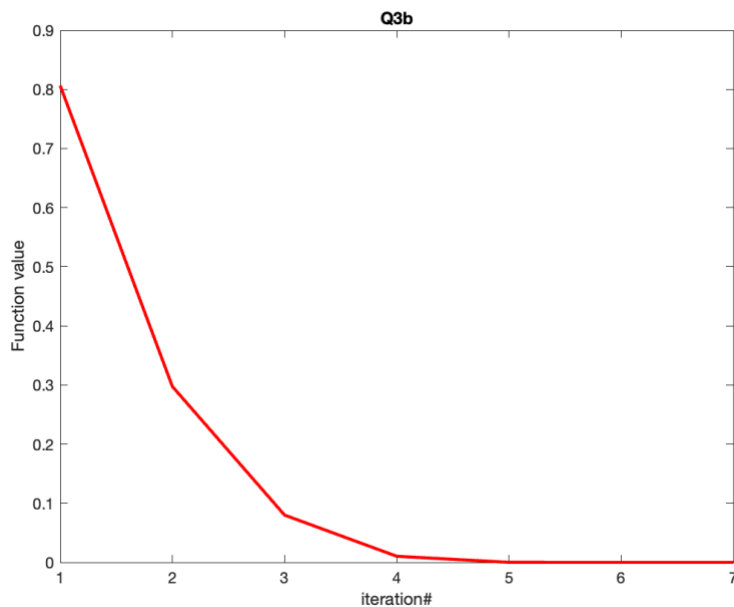


### Q3b) Muller method:

Solution found at iteration 7:  $3.266500e+00 + i-2.086204e-14$

Iteration#	Approx. Sol.	Error
1	$1.581345e+00 + i1.892376e+00$	$2.179540e+00$
2	$2.520911e+00 + i-3.899462e-01$	$2.468153e+00$
3	$3.042779e+00 + i-3.760182e-02$	$6.296764e-01$
4	$3.235723e+00 + i3.336422e-03$	$1.972401e-01$
5	$3.266272e+00 + i-1.669639e-04$	$3.074855e-02$
6	$3.266500e+00 + i-4.814713e-08$	$2.830271e-04$
7	$3.266500e+00 + i-2.086204e-14$	$7.447252e-08$

Initial points: -0.5, 0.1, 0.5



#### Q4) Fixed point method:

Approx solution 5.567764 at iteration 5.

Iteration#	Approx. Sol.	Error
1	8.750000e+00	6.750000e+00
2	6.146429e+00	2.603571e+00
3	5.595004e+00	5.514246e-01
4	5.567831e+00	2.717327e-02
5	5.567764e+00	6.630829e-05

Function chosen:

$$x_n = \frac{1}{2} \left( x_{n-1} + \frac{a}{x_{n-1}} \right)$$

Initial point= 6

