Part a (Using MAE)
Gauss-Seidel Method

Command Window

```
>> Q1
Enter 1 for MAE. Enter 2 for RMSE. Choose a stopping criterion(MAE or RMSE) for part a: 1
Gauss-Seidel Method for part a:
Iteration#      x1          x2          x3          MAE
    1         2.3333     -0.1111      1.0667      1.1704
    2         3.7926      0.5062      0.4830      0.8867
    3         2.8086      0.0447      0.8766      0.6130
    4         3.4872      0.3659      0.6051      0.4238
    5         3.0182      0.1437      0.7927      0.2929
    6         3.3424      0.2973      0.6630      0.2025
    7         3.1183      0.1912      0.7527      0.1400
    8         3.2732      0.2646      0.6907      0.0968
    9         3.1661      0.2138      0.7336      0.0669
   10         3.2401      0.2489      0.7039      0.0462
   11         3.1890      0.2247      0.7244      0.0320
   12         3.2243      0.2414      0.7103      0.0221
   13         3.1999      0.2298      0.7200      0.0153
   14         3.2168      0.2378      0.7133      0.0106
   15         3.2051      0.2323      0.7180      0.0073
   16         3.2132      0.2361      0.7147      0.0050
   17         3.2076      0.2335      0.7170      0.0035
   18         3.2115      0.2353      0.7154      0.0024
   19         3.2088      0.2341      0.7165      0.0017
   20         3.2106      0.2349      0.7157      0.0012
   21         3.2094      0.2343      0.7163      0.0008
   22         3.2102      0.2347      0.7159      0.0006
   23         3.2096      0.2344      0.7161      0.0004
   24         3.2100      0.2346      0.7160      0.0003
   25         3.2098      0.2345      0.7161      0.0002
   26         3.2100      0.2346      0.7160      0.0001
   27         3.2098      0.2345      0.7161      0.0001

ans =

    3.2098
    0.2345
    0.7161
```

Part a (Using MAE)
Jacobi Method

Jacobi Method for part a:

Iteration#	x1	x2	x3	MAE
1	2.3333	-1.6667	2.0000	2.0000
2	5.5556	-0.7778	1.0667	1.6815
3	4.0148	1.6815	-0.2222	1.7630
4	1.4765	1.0840	0.3941	1.2507
5	2.4974	-0.8137	1.4094	1.3113
6	4.4837	-0.4715	1.0010	0.9123
7	3.8252	0.9888	0.2065	0.9711
8	2.2791	0.8146	0.4699	0.6612
9	2.6884	-0.3039	1.0884	0.7154
10	3.8858	-0.2372	0.9247	0.4760
11	3.6453	0.6156	0.4457	0.5241
12	2.7224	0.6150	0.5419	0.3399
13	2.8509	-0.0324	0.9111	0.3817
14	3.5589	-0.0698	0.8597	0.2656
15	3.5028	0.4194	0.5765	0.2761
16	2.9621	0.4764	0.5989	0.2067
17	2.9730	0.1085	0.8151	0.1984
18	3.3840	0.0436	0.8108	0.1601
19	3.3998	0.3191	0.6464	0.1519
20	3.0888	0.3844	0.6401	0.1276
21	3.0586	0.1792	0.7645	0.1199
22	3.2929	0.1176	0.7766	0.1027
23	3.3295	0.2697	0.6828	0.0942
24	3.1539	0.3254	0.6682	0.0820
25	3.1158	0.2132	0.7385	0.0735
26	3.2469	0.1644	0.7537	0.0651
27	3.2835	0.2467	0.7013	0.0571
28	3.1861	0.2886	0.6866	0.0513
29	3.1526	0.2285	0.7256	0.0441
30	3.2246	0.1932	0.7389	0.0402
31	3.2542	0.2367	0.7102	0.0340
32	3.2013	0.2661	0.6983	0.0313
33	3.1757	0.2348	0.7195	0.0260
34	3.2144	0.2107	0.7297	0.0243
35	3.2360	0.2330	0.7143	0.0198
36	3.2080	0.2526	0.7056	0.0188
37	3.1899	0.2368	0.7168	0.0150
38	3.2101	0.2210	0.7240	0.0144
39	3.2250	0.2321	0.7159	0.0114
40	3.2106	0.2447	0.7100	0.0110
41	3.1984	0.2371	0.7158	0.0085
42	3.2087	0.2270	0.7206	0.0084
43	3.2185	0.2322	0.7165	0.0064

```
    44        3.2113      0.2402      0.7126      0.0064
    45        3.2034      0.2367      0.7155      0.0048
    46        3.2084      0.2304      0.7186      0.0048
    47        3.2147      0.2327      0.7166      0.0035
    48        3.2113      0.2376      0.7141      0.0036
    49        3.2063      0.2361      0.7155      0.0026
    50        3.2086      0.2324      0.7175      0.0027
    51        3.2125      0.2332      0.7166      0.0019
    52        3.2110      0.2362      0.7150      0.0020
    53        3.2079      0.2357      0.7156      0.0014
    54        3.2089      0.2334      0.7168      0.0015
    55        3.2113      0.2337      0.7164      0.0010
    56        3.2107      0.2354      0.7155      0.0011
    57        3.2088      0.2353      0.7157      0.0007
    58        3.2092      0.2340      0.7165      0.0008
    59        3.2106      0.2340      0.7163      0.0005
    60        3.2104      0.2350      0.7158      0.0006
    61        3.2093      0.2350      0.7158      0.0004
    62        3.2094      0.2343      0.7163      0.0004
    63        3.2103      0.2342      0.7162      0.0003
    64        3.2102      0.2348      0.7159      0.0003
    65        3.2096      0.2349      0.7159      0.0002
    66        3.2096      0.2344      0.7162      0.0002
    67        3.2101      0.2343      0.7162      0.0002
    68        3.2101      0.2347      0.7160      0.0002
    69        3.2098      0.2347      0.7160      0.0002
    70        3.2097      0.2345      0.7161      0.0001
    71        3.2100      0.2344      0.7161      0.0001
    72        3.2100      0.2346      0.7160      0.0001
    73        3.2098      0.2347      0.7160      0.0001
    74        3.2098      0.2346      0.7161      0.0001

ans =

    3.2098
    0.2346
    0.7161
```

Part b (Using MAE)
Gauss-Seidel and Jacobi Method

```
Enter 1 for MAE. Enter 2 for RMSE. Choose a stopping criterion(MAE or RMSE) for part b: 1
Gauss-Seidel Method for part b:
Iteration#     x1          x2          x3          MAE
    1        0.2500      0.4250      1.6500      0.7750
    2       -0.0031      0.0697      1.5356      0.2409
    3       -0.1078      0.0821      1.5680      0.0498
    4       -0.1112      0.0753      1.5654      0.0043
    5       -0.1131      0.0756      1.5661      0.0010
    6       -0.1132      0.0755      1.5660      0.0001

ans =

   -0.1132
    0.0755
    1.5660

Jacobi Method for part b:
Iteration#     x1          x2          x3          MAE
    1        0.2500      0.4000      1.5000      0.7167
    2        0.0250      0.1250      1.6375      0.2125
    3       -0.1125      0.0750      1.5562      0.0896
    4       -0.1109      0.0775      1.5656      0.0045
    5       -0.1123      0.0758      1.5665      0.0013
    6       -0.1132      0.0755      1.5660      0.0006
    7       -0.1132      0.0755      1.5660      0.0000

ans =

   -0.1132
    0.0755
    1.5660
```

Part a (Using RMSE)
Gauss-Seidel Method

Command Window

```
>> Q1
Enter 1 for MAE. Enter 2 for RMSE. Choose a stopping criterion(MAE or RMSE) for part a: 2
Gauss-Seidel Method for part a:
Iteration#     x1          x2          x3          RMSE
    1        2.3333     -0.1111      1.0667      1.4826
    2        3.7926      0.5062      0.4830      0.9749
    3        2.8086      0.0447      0.8766      0.6674
    4        3.4872      0.3659      0.6051      0.4609
    5        3.0182      0.1437      0.7927      0.3186
    6        3.3424      0.2973      0.6630      0.2202
    7        3.1183      0.1912      0.7527      0.1522
    8        3.2732      0.2646      0.6907      0.1052
    9        3.1661      0.2138      0.7336      0.0727
   10        3.2401      0.2489      0.7039      0.0503
   11        3.1890      0.2247      0.7244      0.0348
   12        3.2243      0.2414      0.7103      0.0240
   13        3.1999      0.2298      0.7200      0.0166
   14        3.2168      0.2378      0.7133      0.0115
   15        3.2051      0.2323      0.7180      0.0079
   16        3.2132      0.2361      0.7147      0.0055
   17        3.2076      0.2335      0.7170      0.0038
   18        3.2115      0.2353      0.7154      0.0026
   19        3.2088      0.2341      0.7165      0.0018
   20        3.2106      0.2349      0.7157      0.0013
   21        3.2094      0.2343      0.7163      0.0009
   22        3.2102      0.2347      0.7159      0.0006
   23        3.2096      0.2344      0.7161      0.0004
   24        3.2100      0.2346      0.7160      0.0003
   25        3.2098      0.2345      0.7161      0.0002
   26        3.2100      0.2346      0.7160      0.0001
   27        3.2098      0.2345      0.7161      0.0001

ans =

    3.2098
    0.2345
    0.7161
```

Part a (Using RMSE)
Jacobi Method

Jacobi Method for part a:

Iteration#	x1	x2	x3	RMSE
1	2.3333	-1.6667	2.0000	2.0184
2	5.5556	-0.7778	1.0667	2.0037
3	4.0148	1.6815	-0.2222	1.8333
4	1.4765	1.0840	0.3941	1.5470
5	2.4974	-0.8137	1.4094	1.3753
6	4.4837	-0.4715	1.0010	1.1873
7	3.8252	0.9888	0.2065	1.0324
8	2.2791	0.8146	0.4699	0.9111
9	2.6884	-0.3039	1.0884	0.7748
10	3.8858	-0.2372	0.9247	0.6988
11	3.6453	0.6156	0.4457	0.5816
12	2.7224	0.6150	0.5419	0.5357
13	2.8509	-0.0324	0.9111	0.4366
14	3.5589	-0.0698	0.8597	0.4104
15	3.5028	0.4194	0.5765	0.3279
16	2.9621	0.4764	0.5989	0.3141
17	2.9730	0.1085	0.8151	0.2465
18	3.3840	0.0436	0.8108	0.2402
19	3.3998	0.3191	0.6464	0.1854
20	3.0888	0.3844	0.6401	0.1835
21	3.0586	0.1792	0.7645	0.1397
22	3.2929	0.1176	0.7766	0.1400
23	3.3295	0.2697	0.6828	0.1053
24	3.1539	0.3254	0.6682	0.1067
25	3.1158	0.2132	0.7385	0.0795
26	3.2469	0.1644	0.7537	0.0812
27	3.2835	0.2467	0.7013	0.0602
28	3.1861	0.2886	0.6866	0.0618
29	3.1526	0.2285	0.7256	0.0456
30	3.2246	0.1932	0.7389	0.0469
31	3.2542	0.2367	0.7102	0.0346
32	3.2013	0.2661	0.6983	0.0356
33	3.1757	0.2348	0.7195	0.0263
34	3.2144	0.2107	0.7297	0.0269
35	3.2360	0.2330	0.7143	0.0201
36	3.2080	0.2526	0.7056	0.0204
37	3.1899	0.2368	0.7168	0.0153
38	3.2101	0.2210	0.7240	0.0154
39	3.2250	0.2321	0.7159	0.0117
40	3.2106	0.2447	0.7100	0.0116
41	3.1984	0.2371	0.7158	0.0090
42	3.2087	0.2270	0.7206	0.0088
43	3.2185	0.2322	0.7165	0.0069

```
   44        3.2113      0.2402      0.7126      0.0066
   45        3.2034      0.2367      0.7155      0.0053
   46        3.2084      0.2304      0.7186      0.0050
   47        3.2147      0.2327      0.7166      0.0040
   48        3.2113      0.2376      0.7141      0.0037
   49        3.2063      0.2361      0.7155      0.0031
   50        3.2086      0.2324      0.7175      0.0028
   51        3.2125      0.2332      0.7166      0.0024
   52        3.2110      0.2362      0.7150      0.0021
   53        3.2079      0.2357      0.7156      0.0018
   54        3.2089      0.2334      0.7168      0.0016
   55        3.2113      0.2337      0.7164      0.0014
   56        3.2107      0.2354      0.7155      0.0012
   57        3.2088      0.2353      0.7157      0.0011
   58        3.2092      0.2340      0.7165      0.0009
   59        3.2106      0.2340      0.7163      0.0008
   60        3.2104      0.2350      0.7158      0.0007
   61        3.2093      0.2350      0.7158      0.0006
   62        3.2094      0.2343      0.7163      0.0005
   63        3.2103      0.2342      0.7162      0.0005
   64        3.2102      0.2348      0.7159      0.0004
   65        3.2096      0.2349      0.7159      0.0004
   66        3.2096      0.2344      0.7162      0.0003
   67        3.2101      0.2343      0.7162      0.0003
   68        3.2101      0.2347      0.7160      0.0002
   69        3.2098      0.2347      0.7160      0.0002
   70        3.2097      0.2345      0.7161      0.0002
   71        3.2100      0.2344      0.7161      0.0002
   72        3.2100      0.2346      0.7160      0.0001
   73        3.2098      0.2347      0.7160      0.0001
   74        3.2098      0.2346      0.7161      0.0001

ans =

    3.2098
    0.2346
    0.7161
```

Part b (Using RMSE)
Gauss-Seidel and Jacobi Method

```
Enter 1 for MAE. Enter 2 for RMSE. Choose a stopping criterion(MAE or RMSE) for part b: 2
Gauss-Seidel Method for part b:
Iteration#     x1          x2          x3          RMSE
    1        0.2500      0.4250      1.6500      0.9943
    2       -0.0031      0.0697      1.5356      0.2604
    3       -0.1078      0.0821      1.5680      0.0636
    4       -0.1112      0.0753      1.5654      0.0046
    5       -0.1131      0.0756      1.5661      0.0012
    6       -0.1132      0.0755      1.5660      0.0001

ans =

   -0.1132
    0.0755
    1.5660

Jacobi Method for part b:
Iteration#     x1          x2          x3          RMSE
    1        0.2500      0.4000      1.5000      0.9078
    2        0.0250      0.1250      1.6375      0.2200
    3       -0.1125      0.0750      1.5562      0.0966
    4       -0.1109      0.0775      1.5656      0.0057
    5       -0.1123      0.0758      1.5665      0.0014
    6       -0.1132      0.0755      1.5660      0.0006
    7       -0.1132      0.0755      1.5660      0.0000

ans =

   -0.1132
    0.0755
    1.5660
```

Brief Report:

The solution for part a is [3.2098; 0.2346; 0.7161]. The solution for part b is [-0.1132;0.0755;1.5660]. For part a, the Jacobi Method required more iterations than the Gauss-Seidel Method to produce the solution. For part b, both methods required around the same number of iterations to produce the solution. There was no difference in using either MAE or RMSE as a stopping criterion.