Problem 4

a

```
list =

   1.000000000000000   3.000000000000000   0.076421071012352   1.013327557754489
   2.000000000000000   3.071255710144770   0.005165360867582   1.002238286858788
   3.000000000000000   3.076084254422156   0.000336816590196   1.021641717021436
   4.000000000000000   3.076399242088345   0.000021828924007                 Inf
   5.000000000000000   3.076419737635205   0.000001333377147                 NaN
   6.000000000000000   3.076421071012352                   0                 NaN
```

Convergence rate is about r=1

b

```
list =

  Columns 1 through 2

  1.000000000000000 + 0.000000000000000i  3.000000000000000 + 0.000000000000000i
  2.000000000000000 + 0.000000000000000i  2.297181106161610 + 0.000000000000000i
  3.000000000000000 + 0.000000000000000i  0.340969474096587 + 0.000000000000000i
  4.000000000000000 + 0.000000000000000i -0.361616449736326 + 1.570796326794897i
  5.000000000000000 + 0.000000000000000i -0.163432457087084 - 1.523148398596271i
  6.000000000000000 + 0.000000000000000i -0.173197769387432 + 1.548912743025078i
  7.000000000000000 + 0.000000000000000i -0.169651426236164 - 1.547877186166636i
  8.000000000000000 + 0.000000000000000i -0.169827337320748 + 1.548337340642442i
  9.000000000000000 + 0.000000000000000i -0.169764299546822 - 1.548318875467595i
 10.000000000000000 + 0.000000000000000i -0.169767427172862 + 1.548327055563247i

  Columns 3 through 4

  0.076421071012352 + 0.000000000000000i  0.540783813758366 + 0.000000000000000i
  0.779239964850742 + 0.000000000000000i  0.257535750030691 + 0.000000000000000i
  2.735451596915765 + 0.000000000000000i -0.167969797124199 + 0.000000000000000i
  3.779881359824413 + 0.000000000000000i -0.101790335080294 + 0.000000000000000i
  3.580032391988200 + 0.000000000000000i -0.183304034774991 + 0.000000000000000i
  3.599882399938464 + 0.000000000000000i -0.097899288231155 + 0.000000000000000i
  3.596235593067890 + 0.000000000000000i -0.181708552585237 + 0.000000000000000i
  3.596592449671340 + 0.000000000000000i -0.097839919098942 + 0.000000000000000i
  3.596527603141902 + 0.000000000000000i  0.000000000000000 + 0.000000000000000i
```

This method does not converge

c

```
list =

   1.000000000000000   3.000000000000000   0.076421071012352   1.599982760803463
   2.000000000000000   3.055327460221039   0.021093610791313   1.877989511206359
   3.000000000000000   3.073731635967090   0.002689435045262   1.740304747888056
   4.000000000000000   3.076364860380311   0.000056210632041                 Inf
   5.000000000000000   3.076421138059519   0.000000067047167                 NaN
```

Convergence rate is about r=2

Problem 5

```
list =

   0.640312423743285   2.434924955420002
   0.062028198165652   1.642142740477134
   0.000210889772824                 Inf
   0.000000018636781                   0
                   0                   0

>> Xold

Xold =

  -0.000000017790777
   1.000000005551385
```

Convergence rate is about r=2

Problem 6

a

```
list =

   1.000000000000000   4.000000000000000   2.066246237172980   1.096258271639736
   2.000000000000000   2.207444866406041   0.273691103579021   1.877120776139125
   3.000000000000000   1.963596048929596   0.029842286102576   1.991283970491291
   4.000000000000000   1.934219603480033   0.000465840653013                 Inf
   5.000000000000000   1.933753880531857   0.000000117704837                 NaN
```

Convergence rate is about r=2

For fzero

```
x0 =

    1.933753762827021
```

b

```
list =

   1.000000000000000   2.000000000000000   1.000000000000000   1.000000000000000
   2.000000000000000   1.500000000000000   0.500000000000000   1.000000000000000
   3.000000000000000   1.250000000000000   0.250000000000000   1.000000000000000
   4.000000000000000   1.125000000000000   0.125000000000000   1.000000000000000
   5.000000000000000   1.062500000000000   0.062500000000000   1.000000000000000
   6.000000000000000   1.031250000000000   0.031250000000000   1.000000000000000
   7.000000000000000   1.015625000000000   0.015625000000000   1.000000000000000
   8.000000000000000   1.007812500000000   0.007812500000000   1.000000000000000
   9.000000000000000   1.003906250000000   0.003906250000000   1.000000000000000
  10.000000000000000   1.001953125000000   0.001953125000000   1.000000000000000
  11.000000000000000   1.000976562500000   0.000976562500000   1.000000000000000
  12.000000000000000   1.000488281250000   0.000488281250000   1.000000000000000
  13.000000000000000   1.000244140625000   0.000244140625000   1.000000000000000
  14.000000000000000   1.000122070312500   0.000122070312500   1.000000000000000
  15.000000000000000   1.000061035156250   0.000061035156250   1.000000000000000
  16.000000000000000   1.000030517578125   0.000030517578125   1.000000000000000
  17.000000000000000   1.000015258789062   0.000015258789062   1.000000000000000
  18.000000000000000   1.000007629394531   0.000007629394531   1.000000000000000
  19.000000000000000   1.000003814697266   0.000003814697266   1.000000000000000
  20.000000000000000   1.000001907348633   0.000001907348633                 Inf
  21.000000000000000   1.000000953674316   0.000000953674316                 NaN
```

Convergence is r=1

You cannot use fzero to solve this problem because it is a double root

```
x0 =

   NaN
```