



# Eliton Machado da Silva

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## Método da bisseção

Com 10 iterações usando o seguinte [algoritmo](#) obtive

### Questao 1:

Aproximação da raiz de  $f$  no intervalo  $[-5, 5]$  é

itr	m	f(m)
1	0.0	-2.0
2	2.5	75.65625
3	1.25	-8.9482421875
4	1.875	6.174285888671875
5	1.5625	-5.186774253845215
6	1.71875	-0.750956803560257
7	1.796875	2.3572235433384776
8	1.7578125	0.7202352015592624
9	1.73828125	-0.03539848984200944
10	1.748046875	0.3373242720371934

### Questao 2:

Aproximação da raiz de  $f$  no intervalo  $[-5, 5]$  é

itr	m	f(m)
1	0.0	1.0
2	2.5	-1.5005505817755007
3	1.25	-1.2417037683761416
4	0.625	0.29967126146703604
5	0.9375	-0.2995062414291363
6	0.78125	0.03819656848050046
7	0.859375	-0.11991293324458152
8	0.8203125	-0.038302838557782826
9	0.80078125	0.0005670220287743444
10	0.810546875	-0.018710444810556504

### Questao 3:

Aproximação da raiz de f no intervalo  $[0.1, 5]$  é

itr	m	f(m)
1	2.55	7.438593359170334
2	1.325	2.0370374594381855
3	0.7125	0.1686808831606686
4	0.40625	-0.7357474828381898
5	0.559375	-0.2680347993280173
6	0.6359375	-0.04823848700487243
7	0.6742187500000001	0.06037025702132787
8	0.6550781250000001	0.006126574203116464

itr	m	f(m)
9	0.6455078125	-0.02103762974923168
10	0.6502929687500001	-0.007451351277187712

## Questao 4:

Aproximação da raiz de f no intervalo [0.1, 5] é

itr	m	f(m)
1	2.55	6.972186718340669
2	1.325	3.212824918876371
3	0.7125	0.7470492663213372
4	0.40625	-0.9890730906763796
5	0.559375	-0.04312037990603468
6	0.6359375	0.3665650181777551
7	0.59765625	0.165833453825746
8	0.578515625	0.06245180358838098
9	0.5689453124999999	0.009948702851761748
10	0.5641601562499999	-0.016513893124466827

## Questao 5:

Aproximação da raiz de f no intervalo [-5, 5] é

itr	m	f(m)
1	0.0	-1.0
2	2.5	14.62444962028836

itr	m	f(m)
3	1.25	0.4934562642013969
4	0.625	-0.8274792889196569
5	0.9375	-0.4581436348869481
6	1.09375	-0.09427649913792568
7	1.171875	0.1658834995506271
8	1.1328125	0.028080253372306352
9	1.11328125	-0.03493791165491533
10	1.123046875	-0.0039002199792643744

## Questao 6:

Aproximação da raiz de f no intervalo  $[-5, 5]$  é

itr	m	f(m)
1	0.0	6.0
2	-2.5	-1.248069545863772
3	-1.25	3.6471113871510976
4	-1.875	1.5141042163861589
5	-2.1875	0.22319656851808123
6	-2.34375	-0.4890492584419519
7	-2.265625	-0.12715813733919656
8	-2.2265625	0.049449349281731614
9	-2.24609375	-0.03849526846227658
10	-2.236328125	0.00556662940731556

## Questao 7:

Aproximação da raiz de  $f$  no intervalo  $[0.1, 5]$  é

itr	m	f(m)
1	2.55	2.3082126612859457
2	1.325	1.8383128470235808
3	0.7125	1.4533445800149987
4	0.40625	0.704229693182775
5	0.253125	-0.11471557727075998
6	0.3296875	0.35653714422178817
7	0.29140625	0.1399895279803962
8	0.27226562499999996	0.01801900215483654
9	0.2626953125	-0.04691212612543261
10	0.26748046875	-0.014099600172050142

## Questao 8:

Aproximação da raiz de  $f$  no intervalo  $(0, 1)$  é

itr	m	f(m)
1	0.5	-0.2806043595274068
2	0.75	0.16157498874152432
3	0.625	-0.05821753144327424
4	0.6875	0.052785267517379
5	0.65625	-0.0025409530101213607
6	0.671875	0.025178426051899017

itr	m	f(m)
7	0.6640625	0.011331230768490741
8	0.66015625	0.004398066995682903
9	0.658203125	0.000929264665872287
10	0.6572265625	-0.0008056702936505289

## Questao 9:

Aproximação da raiz de f no intervalo  $[-5, 5]$  é

itr	m	f(m)
1	0.0	1.0806046117362795
2	2.5	-0.6455605383977385
3	1.25	-3.1296009945400636
4	0.625	-1.2111655746035868
5	0.3125	0.09259449131747066
6	0.46875	-0.5231415393256038
7	0.390625	-0.2051078091062018
8	0.3515625	-0.053655757028692797
9	0.33203125	0.02012308034668242
10	0.341796875	-0.016603189556635534

## Questao 10:

Aproximação da raiz de f no intervalo  $[-5, 5]$  é

itr	m	f(m)
1	0.0	0.001
2	-2.5	-9.374
3	-1.25	-0.389625
4	-0.625	0.147484375
5	-0.9375	0.055931640625
6	-1.09375	-0.111152099609375
7	-1.015625	-0.015117095947265624
8	-0.9765625	0.023351741790771485
9	-0.99609375	0.004875792026519775
10	-1.005859375	-0.004928240716457367

## Método de Newton

Com 10 iterações usando o seguinte [algoritmo](#) e  $x_0 = 1$  obtive

### Questao 1:

Aproximação da raiz de f é

itr	xi	f(xi)
0	1	-9
1	-2.0	-18.0
2	-1.75	-4.4130859375
3	-1.636537109571156	-0.6466540841131092
4	-1.613330610320511	-0.023272257608629943

itr	xi	f(xi)
5	-1.6124311565485618	-3.395358932145598e-05
6	-1.612429840430743	-7.261569123784284e-11
7	-1.6124298404279283	3.552713678800501e-15
8	-1.6124298404279285	-3.552713678800501e-15
9	-1.6124298404279283	3.552713678800501e-15
10	-1.6124298404279285	-3.552713678800501e-15

## Questao 2:

Aproximação da raiz de f é

itr	xi	f(xi)
0	1	-0.45969769413186023
1	0.8286590991016884	-0.05530143734578741
2	0.8016918646332476	-0.00121735733712236
3	0.8010710854190123	-6.272890075154081e-07
4	0.8010707652093035	-1.6686652060116103e-13
5	0.8010707652092184	0.0

## Questao 3:

Aproximação da raiz de f é

itr	xi	f(xi)
0	1	1.0
1	0.6666666666666667	0.03897933633628026



itr	xi	f(xi)
2	0.6529092538420972	-2.6633692566946365e-05
3	0.6529186404138358	-1.5233758698940392e-11
4	0.6529186404192048	1.6653345369377348e-16
5	0.6529186404192047	-1.6653345369377348e-16
6	0.6529186404192048	1.6653345369377348e-16
7	0.6529186404192047	-1.6653345369377348e-16
8	0.6529186404192048	1.6653345369377348e-16
9	0.6529186404192047	-1.6653345369377348e-16
10	0.6529186404192048	1.6653345369377348e-16

## Questao 4:

Aproximação da raiz de f é

itr	xi	f(xi)
0	1	2.0
1	0.5	-0.3862943611198906
2	0.5643823935199818	-0.01528172201816691
3	0.5671389877150601	-2.3778666176754726e-05
4	0.5671432903993691	-5.755684817643214e-11
5	0.5671432904097838	0.0

## Questao 5:

Aproximação da raiz de f é

itr	xi	f(xi)
0	1	-0.33363325460711946
1	1.1520471396200649	0.09391511249412599
2	1.1253901330419582	0.0036866526207166572
3	1.1242555593941888	6.393829832695985e-06
4	1.1242535848362956	1.9329426947933825e-11
5	1.1242535848303261	0.0

## Questao 6:

Aproximação da raiz de f é

itr	xi	f(xi)
0	1	4.367879441171443
1	2.5965878679450074	-1.7410885886629819
2	2.2617182870158685	-0.10936585144577737
3	2.2376849747104313	-0.0005446657857630655
4	2.2375640804545442	-1.3733969517204514e-08
5	2.2375640774059926	0.0

## Questao 7:

Aproximação da raiz de f é

itr	xi	f(xi)
0	1	1.7165256995489035
1	-2.08953563789842	2.0829758765664725

itr	xi	f(xi)
2	2.775099524651682	2.4345131233977675
3	-1.4236712285153805	1.864362622862533
4	5.762348997148266	5.883411281975437
5	1.9213529163248246	2.0153989645905757
6	-3.456856263314581	2.8671838912209653
7	0.6485610955715524	1.352773617442165
8	-0.12732449203989704	-1.4256661415647742
9	-0.22010801271384234	-0.3737887679415399
10	-0.2640464644120241	-0.03757541228239836

## Questao 8:

Aproximação da raiz de f é

itr	xi	f(xi)
0	1	0.5403023058681398
1	0.5639676834471323	-0.16722719381559137
2	0.6577444518000333	0.00011444175598684936
3	0.6576800342864524	-7.632974252658187e-10
4	0.6576800347160952	2.220446049250313e-16
5	0.657680034716095	0.0

## Questao 9:

Aproximação da raiz de f é

itr	xi	f(xi)
0	1	-2.8234678295739304
1	0.12673695065196877	0.7173132660575705
2	0.36129404106243096	-0.09090273752971029
3	0.337646195373348	-0.0009535264316704595
4	0.33739281896345	-1.0993561194716506e-07
5	0.33739278974400283	-1.609823385706477e-15
6	0.3373927897440024	1.1102230246251565e-16
7	0.33739278974400244	5.551115123125783e-17
8	0.33739278974400244	5.551115123125783e-17
9	0.33739278974400244	5.551115123125783e-17
10	0.33739278974400244	5.551115123125783e-17

## Questao 10:

Aproximação da raiz de f é

itr	xi	f(xi)
0	1	2.001
1	0.5998	0.576544111992
2	0.3468055107628918	0.16298576990143254
3	0.19223358662286574	0.04505750407855309
4	0.101268680379389	0.012293890944140417
5	0.048573815800885614	0.0034740213993098633
6	0.015242157152999411	0.001235864463759026

itr	xi	f(xi)
7	-0.024392658690151697	0.0015804881221962211
8	0.009234524947569683	0.0010860639385215538
9	-0.04876659346435304	0.0032622048697536097
10	-0.01267971551130815	0.0011587366018349539

## Método da secantes

Com 10 iterações usando o seguinte [algoritmo](#) e  $x_0 = 1$  obtive

### Questao 1:

Aproximação da raiz de f é

itr	xn	f(xn)
0	1	-9
1	2	14
2	1.391304347826087	-7.917158858687301
3	1.6111841326980654	-4.032071988079089
4	1.8393826648941722	4.340190794184416
5	1.7210842795661176	-0.6675010310153873
6	1.736852880536442	-0.08907093816193878
7	1.7392810461856383	0.0022973580409999528
8	1.7392199925586047	-7.593080610490688e-06
9	1.739220193684393	-6.439151434278756e-10
10	1.7392201937014504	-1.7763568394002505e-15

## Questao 2:

Aproximação da raiz de  $f$  é

itr	$x_n$	$f(x_n)$
0	1	-0.45969769413186023
1	2	-2.653643620863612
2	0.7904699069695593	0.02058525361526009
3	0.7997804353083772	0.0025250411528868755
4	0.8010821623650004	-2.232716310968108e-05
5	0.8010707529931655	2.3931165382684583e-08
6	0.8010707652091027	2.2659651932599445e-13
7	0.8010707652092184	0.0

## Questao 3:

Divisão por zero na iteração 9

Aproximação da raiz de  $f$  é

itr	$x_n$	$f(x_n)$
0	1	1.0
1	2	4.693147180559945
2	0.7292282297158862	0.21600528735677704
3	0.6679182627876962	0.04252533173684975
4	0.6528892833699895	-8.329847676324942e-05
5	0.6529186645325973	6.841986260885946e-08
6	0.6529186404192479	1.224020884649235e-13

itr	xn	f(xn)
7	0.6529186404192048	1.6653345369377348e-16
8	0.6529186404192048	1.6653345369377348e-16

## Questao 4:

Aproximação da raiz de f é

itr	xn	f(xn)
0	1	2.0
1	2	5.386294361119891
2	0.40938389085035876	-0.9674361277407002
3	0.6515753863907469	0.4464264186286061
4	0.5751035382227285	0.0437967006044615
5	0.5667851889083252	-0.001979427341647799
6	0.5671448866112347	8.821312673434889e-06
7	0.5671432907314145	1.7774739458076283e-09
8	0.5671432904097836	-1.3322676295501878e-15
9	0.567143290409784	4.440892098500626e-16
10	0.5671432904097838	0.0

## Questao 5:

Aproximação da raiz de f é

itr	xn	f(xn)
0	1	-0.33363325460711946

itr	xn	f(xn)
1	2	6.727035131168812
2	1.0472523614448797	-0.22181162141329747
3	1.0776646738803315	-0.1405124256138044
4	1.1302274052432517	0.01952154742947876
5	1.1238156050872519	-0.0014172660400320058
6	1.1242495946554671	-1.2920456281761972e-05
7	1.1242535875068762	8.666903195120312e-09
8	1.12425358483031	-5.262457136723242e-14
9	1.1242535848303261	0.0

## Questao 6:

Aproximação da raiz de f é

itr	xn	f(xn)
0	1	4.367879441171443
1	2	1.0183156388887342
2	2.3040144027693272	-0.3035329357315053
3	2.234204300501187	0.015125459909532957
4	2.237517911306931	0.00020797997559540704
5	2.2375641097732646	-1.4581715657158156e-07
6	2.237564077405681	1.404210081545898e-12
7	2.2375640774059926	0.0



## Questao 7:

Aproximação da raiz de  $f$  é

itr	$x_n$	$f(x_n)$
0	1	1.7165256995489035
1	2	2.0458777735424696
2	-4.211825991362776	3.4946257477566753
3	10.772151509468461	5.555189418758834
4	-29.623995639459373	7.580220673267443
5	121.58932961509889	10.152530126711275
6	-475.22760395864225	12.8433294527742
7	2373.4116188322005	16.484433889284094
8	-10523.281063657314	20.16124448727047
9	60193.81662727647	23.870553799023345
10	-394892.6005646387	27.939056938922224

## Questao 8:

Aproximação da raiz de  $f$  é

itr	$x_n$	$f(x_n)$
0	1	0.5403023058681398
1	2	-0.6645873461885696
2	1.4484247208413321	0.7045120331206411
3	1.7322546803109105	0.24986785153095847
4	1.8882447601241126	-0.22469299251321728

itr	xn	f(xn)
5	1.81438725949909	0.020392484630072705
6	1.8205326172896326	0.001398903705302601
7	1.8209852314553157	-1.00512913580042e-05
8	1.820982002568046	4.8836463761858795e-09
9	1.820982004136112	1.6653345369377348e-14
10	1.820982004136117	6.661338147750939e-16

## Questao 9:

Aproximação da raiz de f é

itr	xn	f(xn)
0	1	-2.8234678295739304
1	2	-1.1032875163625329
2	2.6413789925910787	-2.432508750026376
3	1.4676390822975138	-2.197224041210617
4	-9.493419806764798	11.49341980108778
5	-0.29151135544623963	1.7587908705799802
6	1.3710309655426312	-2.7675725443886474
7	0.35449604343786967	-0.06484976586090946
8	0.3301050654908671	0.02732843294480186
9	0.33733635460173117	0.0002123268220551311
10	0.33739297765185944	-7.069869019660224e-07

## Questao 10:

Aproximação da raiz de  $f$  é

itr	$x_n$	$f(x_n)$
0	1	2.001
1	2	12.001
2	0.7998999999999999	1.1526480339989997
3	0.6723881982131965	0.757096553267485
4	0.428327057410029	0.26304669254336427
5	0.29838171996465973	0.1165970679087715
6	0.19492467545293837	0.04640191477146555
7	0.12653526753256047	0.01903715210622093
8	0.07895803922031973	0.00772662574305328
9	0.04645633017010284	0.0032584522285552804
10	0.02275419193780256	0.001529534307586172