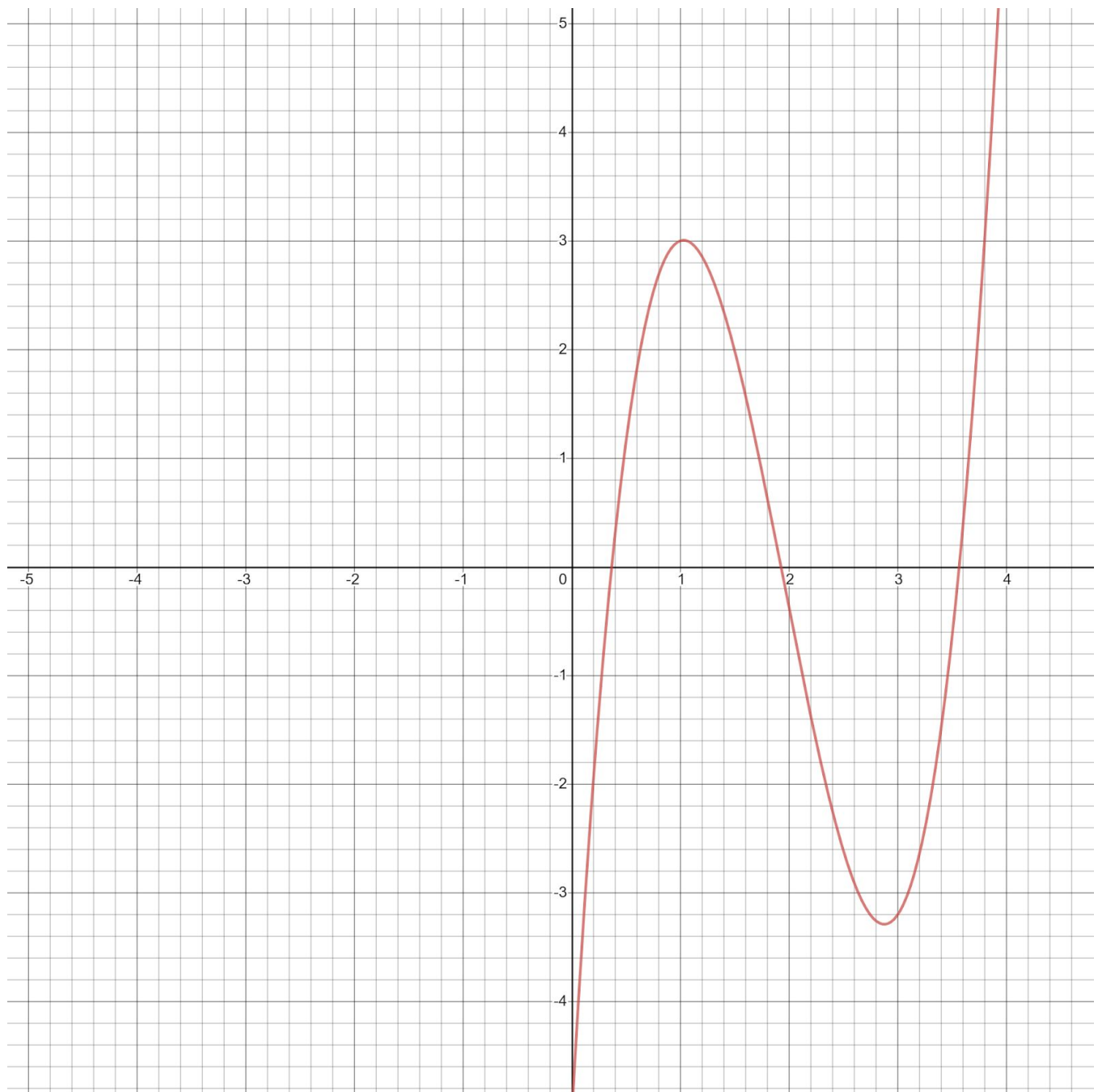


$$\text{a. } f(x) = 2x^3 - 11.7x^2 + 17.7x - 5$$

The roots are:

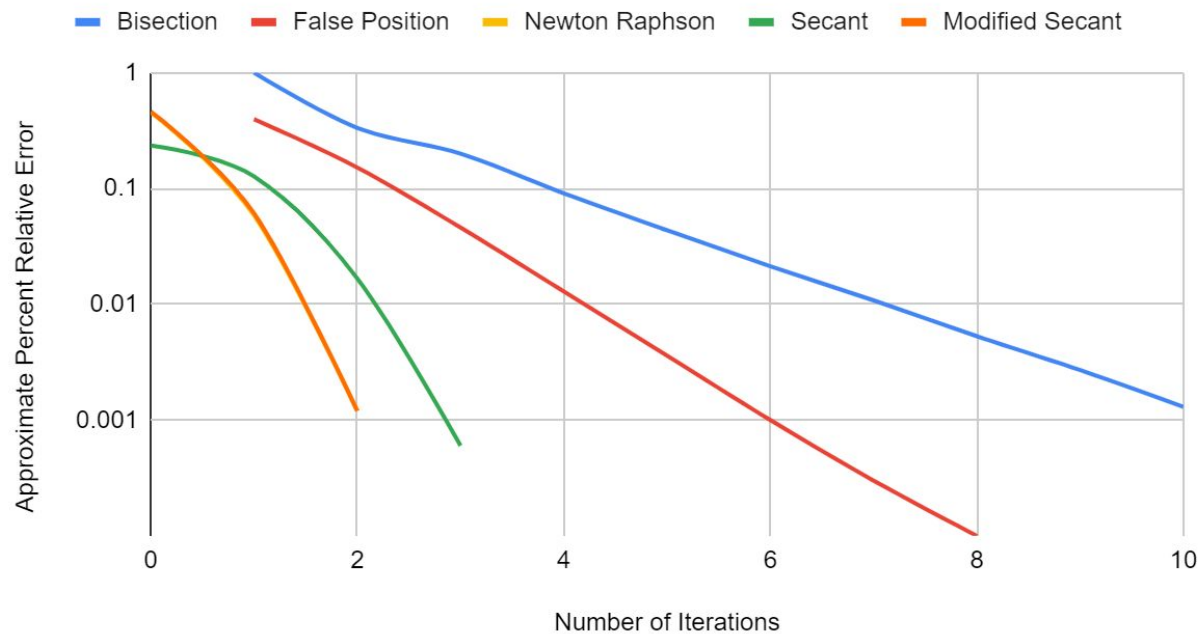
- $x_1 \approx 0.36509\dots$
- $x_2 \approx 1.92174\dots$
- $x_3 \approx 3.56316\dots$



Finding roots  $x_1 = 0.36509$

Approximate Percent Relative Error vs. Number of Iterations					
n	Bisection	False position	Newton Raphson	Secant	Modified Secant
0			0.4563	0.235	0.4602
1	1	0.3961	0.0585	0.1271	0.061
2	0.3333	0.1517	0.0012	0.0167	0.0012
3	0.2	0.046	0	0.0006	0
4	0.0909	0.0129	0	0	0
5	0.0435	0.0036	0	0	0
6	0.0213	0.001	0	0	0
7	0.0108	0.0003	0	0	0
8	0.0053	0.0001	0	0	0
9	0.0027	0	0	0	0
10	0.0013	0	0		0

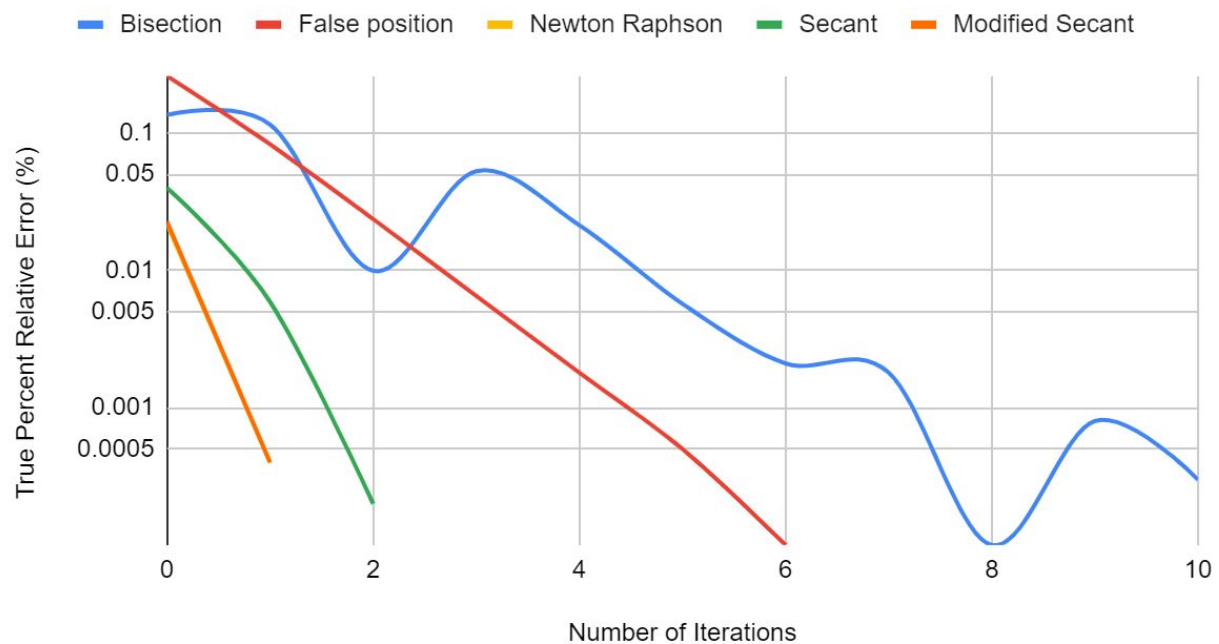
Approximate Percent Relative Error vs. Number of Iterations



Note that the curves of **Newton Raphson** and **Modified Secant** overlap with each other.

True Percent Relative Error vs. Number of Iterations					
n	Bisection	False position	Newton Raphson	Secant	Modified Secant
0	0.1349	0.2599	0.0218	0.0398	0.0227
1	0.1151	0.0826	0.0004	0.0059	0.0004
2	0.0099	0.0236	0	0.0002	0
3	0.0526	0.0065	0	0	0
4	0.0213	0.0018	0	0	0
5	0.0057	0.0005	0	0	0
6	0.0021	0.0001	0	0	0
7	0.0018	0	0	0	0
8	0.0001	0	0		0
9	0.0008	0	0		0
10	0.0003	0	0		0

True Percent Relative Error vs. Number of Iterations

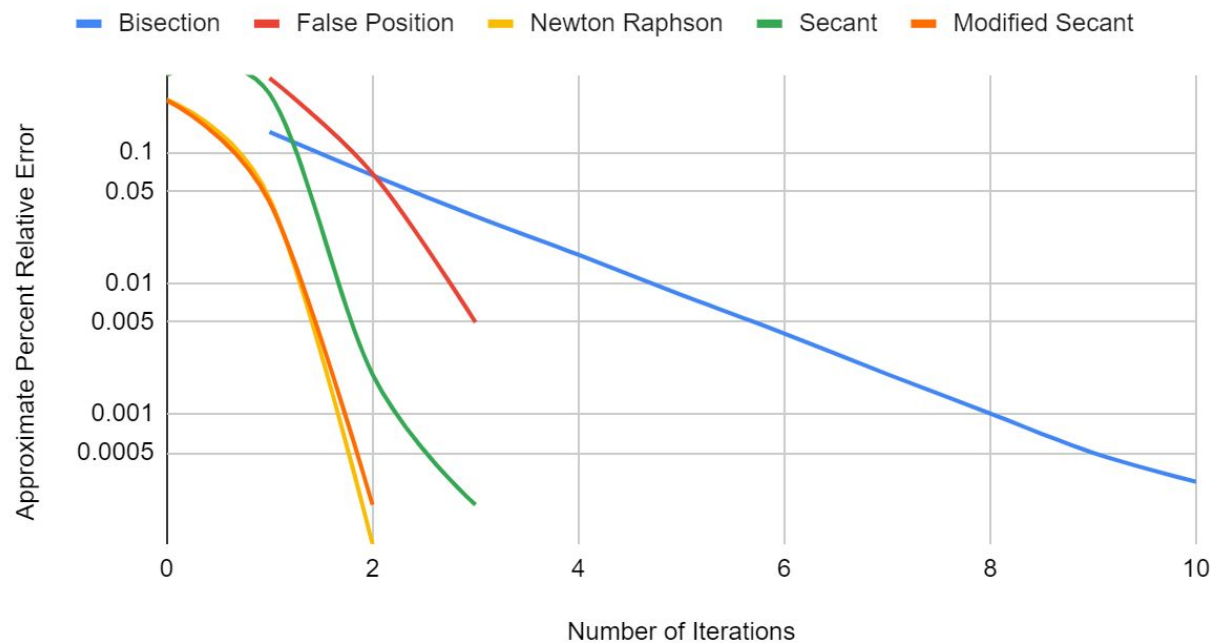


Note that the curves of **Newton Raphson** and **Modified Secant** overlap with each other.

**Finding roots  $x_2 = 1.92174$**

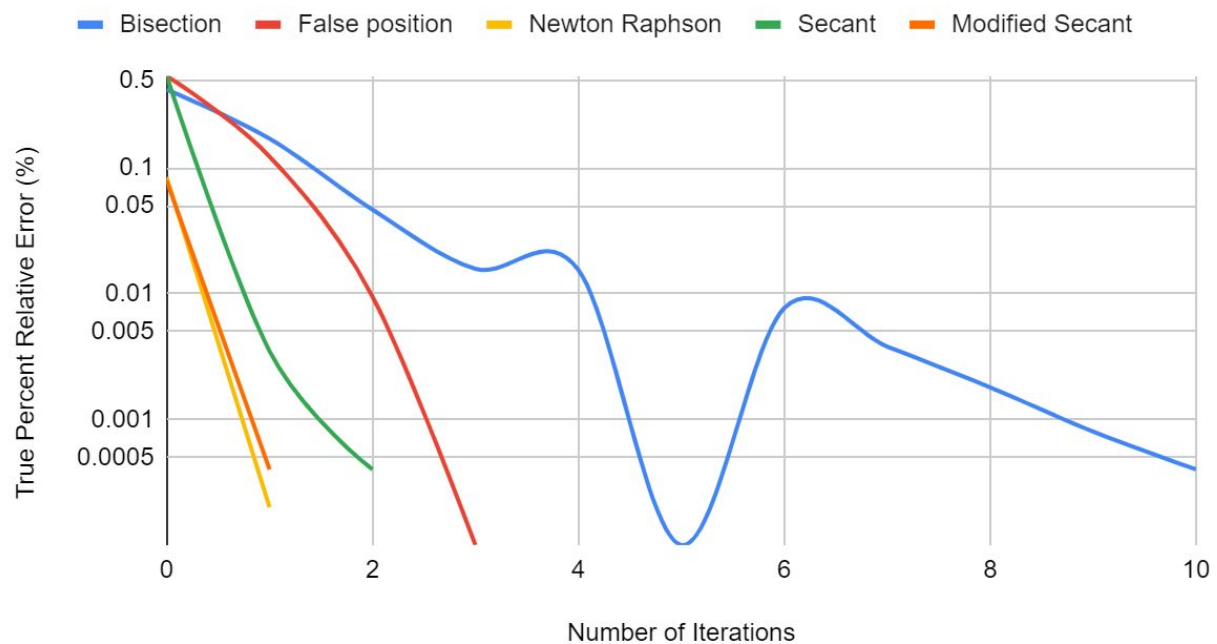
Approximate Percent Relative Error vs. Number of Iterations					
n	Bisection	False position	Newton Raphson	Secant	Modified Secant
0			0.2524	0.3911	0.2505
1	0.1429	0.3699	0.0442	0.2796	0.0416
2	0.0667	0.0689	0.0001	0.002	0.0002
3	0.0323	0.005	0	0.0002	0
4	0.0164	0	0	0	0
5	0.0081	0	0	0	0
6	0.0041	0	0	0	0
7	0.002	0	0	0	0
8	0.001	0	0		0
9	0.0005	0	0		0
10	0.0003	0	0		0

Approximate Percent Relative Error vs. Number of Iterations



True Percent Relative Error vs. Number of Iterations					
n	Bisection	False position	Newton Raphson	Secant	Modified Secant
0	0.4217	0.5417	0.0847	0.5417	0.0795
1	0.1717	0.1235	0.0002	0.0035	0.0004
2	0.0467	0.0095	0	0.0004	0
3	0.0158	0.0001	0	0	0
4	0.0155	0	0	0	0
5	0.0001	0	0	0	0
6	0.0077	0	0	0	0
7	0.0038	0	0	0	0
8	0.0018	0	0		0
9	0.0008	0	0		0
10	0.0004	0	0		0

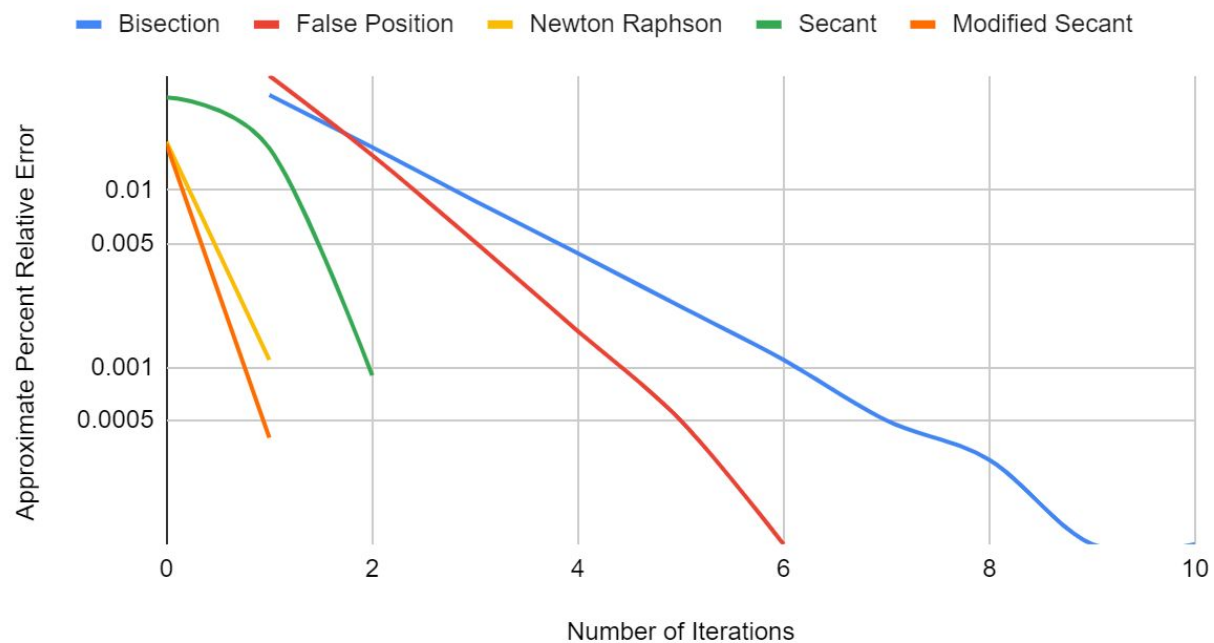
True Percent Relative Error vs. Number of Iterations



Finding roots  $x_3 = 3.56316$

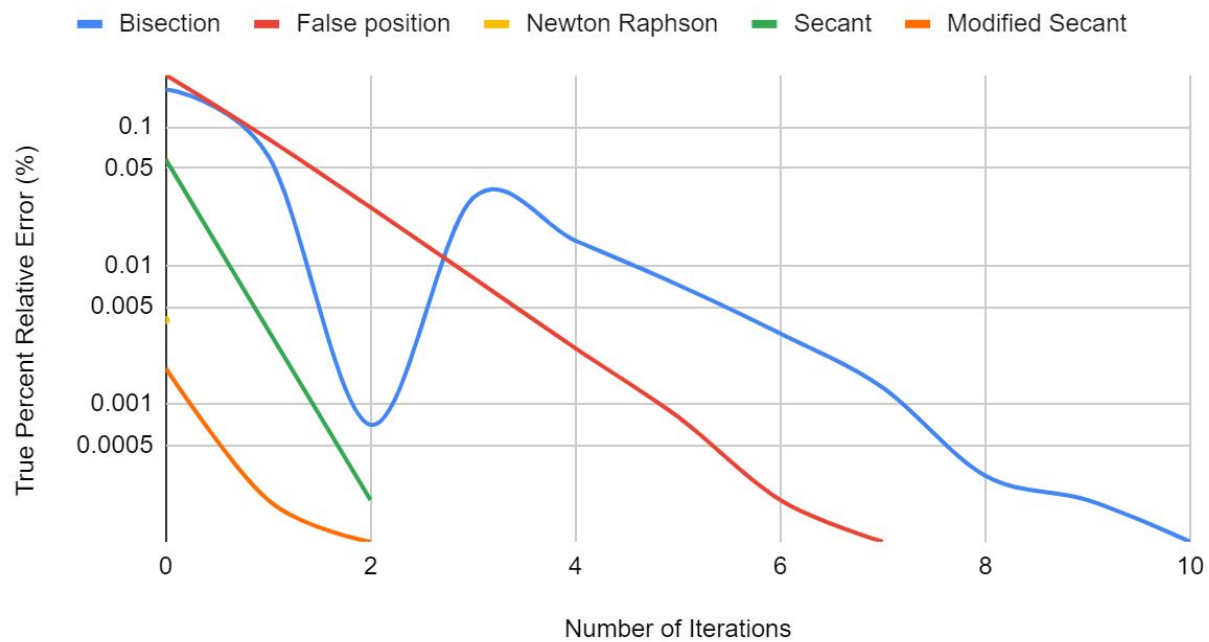
ApproximatePercent Relative Error vs. Number of Iterations					
n	Bisection	False position	Newton Raphson	Secant	Modified Secant
0			0.0188	0.0335	0.0182
1	0.0345	0.0444	0.0011	0.0173	0.0004
2	0.0175	0.0158	0	0.0009	0
3	0.0087	0.0051	0	0	0
4	0.0044	0.0016	0	0	0
5	0.0022	0.0005	0	0	0
6	0.0011	0.0001	0	0	0
7	0.0005	0	0		0
8	0.0003	0	0		0
9	0.0001	0	0		0
10	0.0001	0	0		0

Approximate Percent Relative Error vs. Number of Iterations



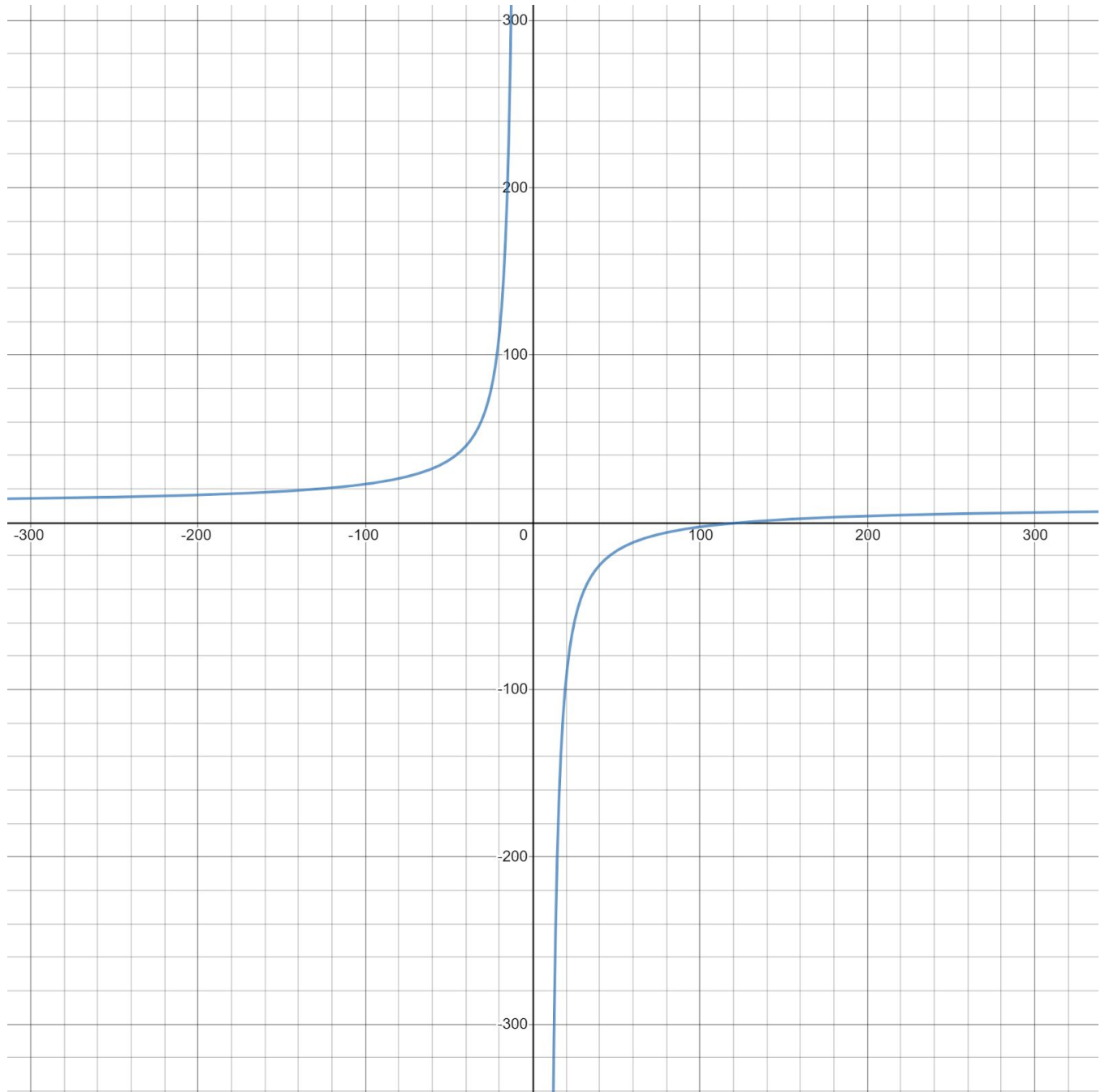
True Percent Relative Error vs. Number of Iterations					
n	Bisection	False position	Newton Raphson	Secant	Modified Secant
0	0.1868	0.2366	0.004	0.0582	0.0018
1	0.0618	0.0819	0	0.0034	0.0002
2	0.0007	0.0261	0	0.0002	0.0001
3	0.0306	0.0081	0	0	0
4	0.015	0.0025	0	0	0
5	0.0072	0.0008	0	0	0
6	0.0032	0.0002	0	0	0
7	0.0013	0.0001	0		0
8	0.0003	0	0		0
9	0.0002	0	0		0
10	0.0001	0	0		0

True Percent Relative Error vs. Number of Iterations



$$b. f(x) = x + 10 - x \cosh(50/x)$$

The root is:  $x \approx 126.632$

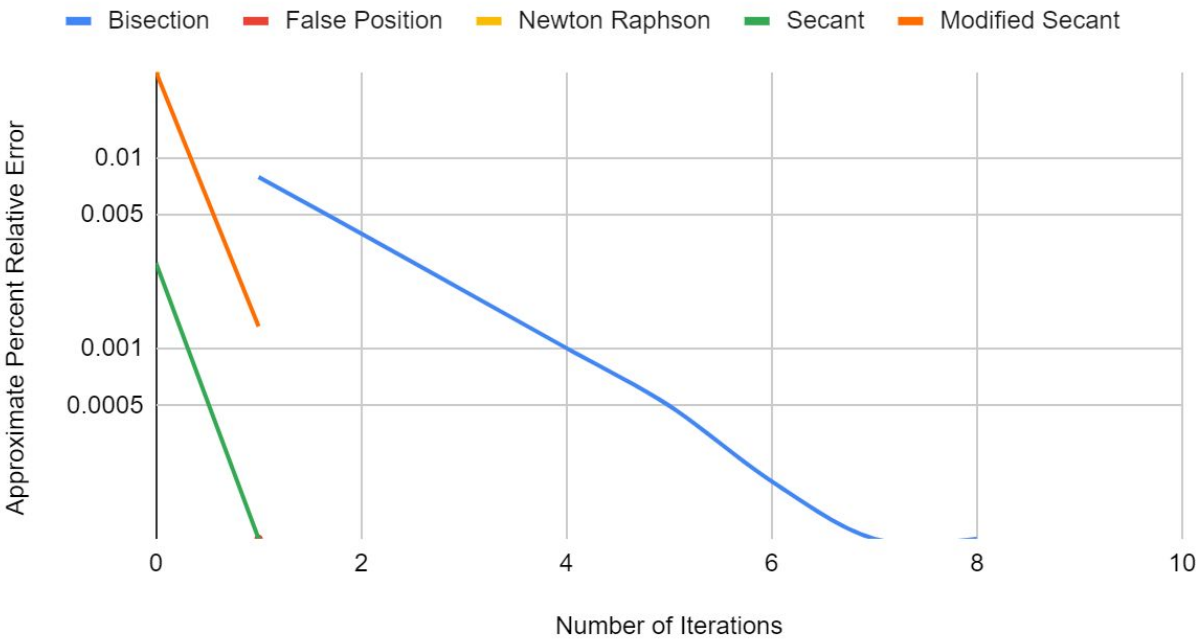




Finding root  $x = 126.632$

Approximate Percent Relative Error vs. Number of Iterations					
n	Bisection	False position	Newton Raphson	Secant	Modified Secant
0			0.0279	0.0028	0.0281
1	0.0079	0.0001	0	0.0001	0.0013
2	0.004	0	0	0	
3	0.002	0	0	0	
4	0.001	0	0	0	
5	0.0005	0	0		
6	0.0002	0	0		
7	0.0001	0	0		
8	0.0001	0	0		
9	0	0	0		
10	0	0	0		

Approximate Percent Relative Error vs. Number of Iterations



True Percent Relative Error vs. Number of Iterations					
n	Bisection	False position	Newton Raphson	Secant	Modified Secant
0	1.632	0.0114	0.1078	0.0114	0.0711
1	0.632	0.0008	0.0003	0.0004	0.0912
2	0.132	0.0004	0.0004	0.0004	
3	0.118	0.0004	0.0004	0.0004	
4	0.007	0.0004	0.0004	0.0004	
5	0.0555	0.0004	0.0004		
6	0.0242	0.0004	0.0004		
7	0.0086	0.0004	0.0004		
8	0.0008	0.0004	0.0004		
9	0.0031	0.0004	0.0004		
10	0.0011	0.0004	0.0004		

True Percent Relative Error vs. Number of Iterations

