

Lesson: Finding Roots: Summary

	Bisection	Newton	Secant
Type	Bracketing	Slope	Slope
Convergence	Global (1)	Local (2)	Local
How fast?	Slow	Fast	Medium
Function Info	$f(x)$	$f(x), f'(x)$	$f(x)$
Roots of multiplicity k	k even, won't work	will work for any k but slower	Will work for any k but slower
No roots	Handles OK (3)	Handles OK (4)	Handles OK (4)
More than one root	Adequate (5)	Flaky (6)	Flaky (6)

- (1) If there is a root in the interval, then it doesn't matter how big the initial interval.
- (2) In theory, it converges if started "close enough".
- (3) If no roots, it'll quit on the first step. Unfortunately, just because it quits on the first step doesn't mean there is not a root.
- (4) If there are no roots, you will find out soon enough (diverges fast). Again, just because it diverges doesn't mean there is not a root.
- (5) Once you've bracketed the one you want, you've got it.
- (6) Even if you start closer to the one you want, it still might converge to a different root.