Banach Fixed Point Principle
(Contraction Mapping Theorem)

- X a complete metric space
- $f: X \to X$ a contraction mapping

<u>Conclusion</u> f has a unique fixed point P in X, i.e. $f(P) = P$

And for any z_0 in X the iteration

$$z_{n+1} = f(z_n) \qquad n = 0, 1, 2, \ldots$$

yields a sequence so that $d(z_n, P) \to 0$ as $n \to \infty$