

Iteration with a Graph, and Time Series Plots

Worksheet to accompany

David Feldman, *Chaos and Fractals: An Elementary Introduction*,
Oxford University Press, 2012

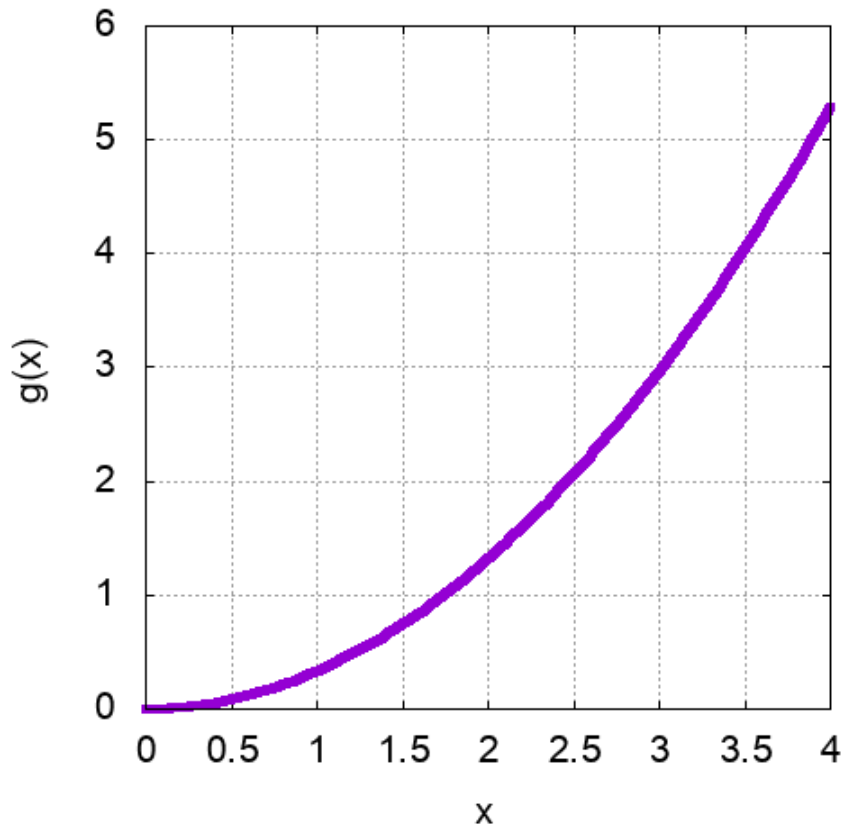


Figure 1: The function $g(x)$.

1. The following problems refer to the function $g(x)$, shown in Fig. 1. Determine approximate values for the following:
 - (a) $g(3)$
 - (b) $g(2)$
 - (c) $g(1)$
 - (d) $g(0)$
 - (e) $g(g(2))$
 - (f) $g(g(3))$
2. Make a graph of the iterates of the seeds 0, 1, 2, and 3.

3. Let $h(x) = 2x - 6$

- (a) Use algebra to find any fixed points.
- (b) Experimentally determine the stability of the fixed point. To do so, choose seeds near the fixed point, iterate a few times, and see what happens.
- (c) Summarize your analysis by drawing the phase line for $h(x)$.