Chapter 3: Qualitative Dynamics: The Fate of the Orbit

Worksheet to accompany

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

1. 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 $h(x)$.

2. Let $g(x) = x^2$. Compute the first several iterates for several different seeds for the function $g(x)$. Choose enough seeds so you can get a sense of the overall dynamics of the function. Are there any fixed points? If so, are they attracting or repelling? In your analysis, choose only non-negative seeds. (I.e., don't worry about negative numbers.) Summarize your analysis by drawing the phase line for $g(x)$.