Exercises

(5.1) Verify that the function $f(x) = -\frac{3}{4}x - 1$ has a fixed point at $x^* = -\frac{4}{7}$.

(5.2) Figure 5.10 shows a plot of the function $f(x) = 1.5x(1-x)$.

(a) Use the plot to determine approximate values for all fixed points of $f(x)$.

(b) Graphically iterate the seed $x_0 = 0.1$.

(c) Graphically iterate the seed $x_0 = 0.8$.

(d) What do you conclude about the stability of the fixed point near $x = 0.35$?

(e) What is the stability of the fixed point at $x = 0$?

(f) Use algebra to find the fixed points exactly.

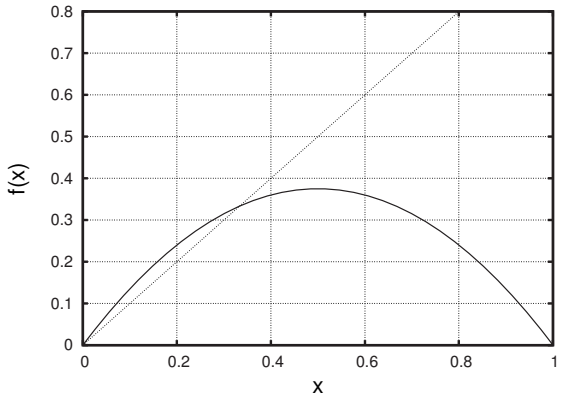

Fig. 5.10 A plot of $f(x) = 1.5x(1-x)$, the function for Exercise 5.2.

(5.3) Consider the function shown in Fig. 5.11.

(a) Choose several initial conditions and graphically iterate.

(b) What do your results let you conclude about the stability of the three fixed points?

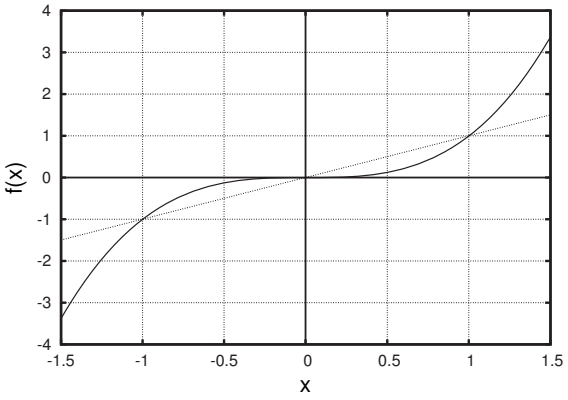

Fig. 5.11 The function for Exercise 5.3.

(5.4) Figure 5.12 shows a plot of the function $f(x) = 3.2x(1-x)$.

(a) Use the plot to determine approximate values for all fixed points of $f(x)$.

(b) Graphically iterate the seed $x_0 = 0.1$.

(c) Graphically iterate the seed $x_0 = 0.8$.

(d) What does this let you conclude about the stability of the fixed point near $x = 0.7$?

(e) Use algebra to find the fixed point(s) exactly.

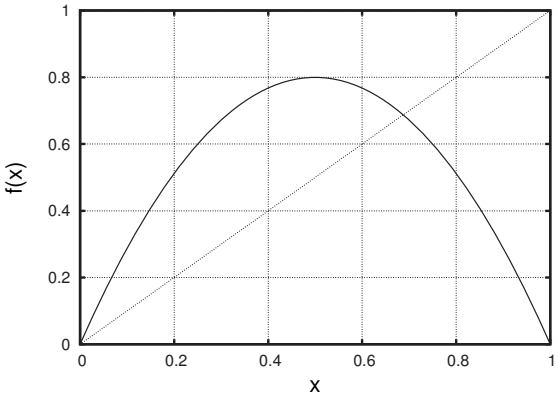

Fig. 5.12 A plot of $f(x) = 3.2x(1-x)$, the function for Exercise 5.4.