Math 161   Summer 2023
Homework 3   Drew Armstrong

Book Problems:

- Section 2.7, Exercises 4, 6
- Section 2.8, Exercises 12, 14, 22, 24
- Section 3.3., Exercises 2, 4, 28, 30, 34
- Section 3.5, Exercises 2, 4, 8, 16
- Section 3.6, Exercises 8, 14

Additional Problems:

A1. The Babylonian Algorithm for Square Roots. Given a positive number $a > 0$ note that $x = \sqrt{a}$ is the unique positive solution of the equation $f(x) = 0$ where $f(x) = x^2 - a$.

(a) Show that Newton's method leads to the following algorithm to compute $\sqrt{a}$:

$$x_{n+1} = \frac{1}{2}\left(x_n + \frac{a}{x_n}\right).$$

(b) Use this algorithm with $a = 3$ to find $\sqrt{3}$ accurate to six decimal places. [Hint: Start with the guess $x_1 = 1$. You can stop when the first six decimal places don't change.]