1. You are given the following statements:
   \[A \land B \rightarrow C\]
   \[B \lor D\]
   \[C \lor \neg D\]
   Using this, prove \(A \rightarrow C\).

2. Textbook, p. 54, problem 12

3. Textbook, p. 55, problem 14

4. Textbook, p. 55, problem 16

5. Textbook, p. 55, problem 17

6. Guess a formula for the product
   \[
   \left(1 - \frac{1}{2^2}\right) \left(1 - \frac{1}{3^2}\right) \ldots \left(1 - \frac{1}{n^2}\right)
   \]
   and prove it using induction. [Hint: try computing the answer for \(n = 2, 3, 4, 5\) and writing it as a fraction with denominator \(2n\); see if you can guess the pattern.]

7. Let the sequence \(F_n\) be defined by the formulas
   \[F_1 = 1\]
   \[F_2 = 1\]
   \[F_n = F_{n-1} + F_{n-2} \quad \text{for } n \geq 3\]
   (this sequence is called the Fibonacci numbers).
   Use strong induction to prove the following formula:
   \[F_1 + F_2 + \cdots + F_n = F_{n+2} - 1.\]