1. Study Sections 2.3, 2.4.

2. Study English expressions handout.

3. Do Exercises 2.3(d, e, h), 2.4(b, d, f).

4. Do Exercise 2.5. Use
   
   \( r \) for “It’s raining,”
   
   \( s \) for “I’m going swimming,”
   
   \( sc \) for “It’s raining cats,”
   
   \( sd \) for “It’s raining dogs,”
   
   \( eh \) for “I’ll eat my hat.”

5. Do Exercise 2.7. Use
   
   \( xly \) for \( x < y \),
   
   \( xey \) for \( x = y \),
   
   \( xgy \) for \( x > y \),
   
   \( ylz \) for \( y < z \),
   
   \( ygz \) for \( y > z \),
   
   \( vew \) for \( v = w \),
   
   \( ¬xly \) for \( x \geq y \),
   
   \( ep \) for “Execution of \( P \) is begun with \( x < y \),”
   
   \( ty \) for “Execution of \( P \) terminates with \( y = 2x \),”
   
   \( ep1 \) for “Execution of \( P \) is begun with \( x < 0 \),”
   
   \( ept \) for “Execution of \( P \) terminates.”

   Hint for part (e): None or one of the three must be true. So, the expression should start like this.

   \((¬xly ∧ ¬ylz ∧ ¬vew) ∨ (xly ∧ ¬ylz ∧ ¬vew) ∨ \ldots, etc.\)

   Hint for part (i): The word “means” translates to \( ≡ \).

6. Translate the following English sentences into boolean expressions. Use
   
   \( xgy \) for \( x > y \),
   
   \( ylz \) for \( y < z \).

   (a) \( x > y \) if \( y < z \).
   (b) \( x > y \) iff \( y < z \).
   (c) \( x > y \) only if \( y < z \).
   (d) \( x > y \) if and only if \( y < z \).
   (e) \( x > y \) is a sufficient condition for \( y < z \).
   (f) \( x > y \) is a necessary condition for \( y < z \).
   (g) \( x > y \) is a necessary and sufficient condition for \( y < z \).
   (h) \( x > y \) whenever \( y < z \).
   (i) \( x > y \) provided that \( y < z \).
   (j) \( x > y \) unless \( y < z \).
   (k) \( x > y \) unless it is not the case that \( y < z \).