1. Read Chapter 1 of the textbook.

2. Let the propositions p, q, r, and s be given as follows. $p : 1 + 3 = 6$; $q : -1$ is the square of some real number; r: The capital of France is Paris; s: Sierra Nevada Beer is brewed in Chico, CA. Find the truth values for:

   (a) $p \vee q$;

   (b) $r \wedge s$;

   (c) $\overline{(p \vee q)} \wedge (\overline{r} \vee s) \wedge (\overline{p} \wedge s)$;

   (d) $(p \vee s) \wedge \overline{(q \vee r) \vee \overline{(r \vee s)}}$;

   (e) $\overline{p \to q}$;

   (f) $(p \wedge r) \leftrightarrow r$;

   (g) $p \vee (\overline{p} \wedge \overline{(q \vee r)}) \to (p \vee \overline{(r \vee q)})$.

3. Find the truth tables for

   (a) $(p \wedge q) \vee \overline{q}$;

   (b) $(p \vee q) \wedge \overline{(\overline{p} \vee q)}$.

4. Work on problems 42–55 of Section 1.2 of the textbook.

5. Are the following statements true or false? Prove your claim.

   (a) $\forall x \in \mathbb{R} \ x^2 - 16 = 0$;

   (b) $\exists x \in \mathbb{R} \ x^2 - 16 = 0$;

   (c) $\forall x \in \mathbb{R} \ \exists y \in \mathbb{R} \ x = y^2$;

   (d) $\exists x \in \mathbb{R} \ \forall y \in \mathbb{R} \ xy = 0$;

   (e) $\forall \varepsilon > 0 \ \exists N \in \mathbb{N} \ \frac{1}{N} < \varepsilon$;

   (f) $\forall \varepsilon > 0 \ \exists \delta > 0 \ \forall x \in (0, \delta) \ x^2 \in (0, \varepsilon)$.