1. Answer the following:

(a) Translate the following statement into symbols: To qualify for a loan of $45,000, an applicant must have a gross income of $30,000 if single, $50,000 combined income if married, and assets of at least $10,000.

(b) Determine whether or not each of the following applicants qualifies for a loan.

i. Mr. Argento, married with two children, makes $37,000 on his job. Mrs. Argento earns $15,000 at a part-time job. The Argentos have assets of $25,000.

ii. Ms. McVey, single, has assets of $19,000. She works in a store and earns $25,000.

iii. Mr. Siewert earns $24,000 and Ms. Fox, his wife, earns $28,000. Their assets total $80,000.
2. The pie graphs below give the top five cosmetic procedures for males and females, by percentage. Translate the following compound statements into symbols, and use the pie graphs below to determine the truth values of the compound statements.

(a) The most common surgery procedure for females is liposuction or the most common procedure for males is eyelid surgery, and 20% of male cosmetic surgery is for nose reshaping.

(b) 7% of female cosmetic surgeries are for face-lifts and 10% of male cosmetic surgeries are for face-lifts, if and only if males have a higher percent of eyelid surgeries than females.
3. Construct a truth table for each of the following statements.

(a) $p \leftrightarrow (p \lor q)$
(b) $(p \land \sim q) \to (p \lor (r \to q))$
(c) $(p \lor (q \land \sim r)) \to ((\sim p \to \sim q) \lor (q \to r))$
4. Determine if the following compound statements are tautologies:

(a) \([(p \rightarrow q) \rightarrow p] \rightarrow q\)
(b) \((p \rightarrow q) \leftrightarrow (p \rightarrow \neg q)\)
(c) \((p \land [(p \rightarrow q) \land (q \rightarrow r)]) \rightarrow r\)