1. (1 point) True or False: Bottom-up parsing is a more powerful parsing technique than top-down.

2. (1 point) Complete the sentence appropriately: Recursive-Descent is a top-down parsing technique because ...it constructs the parse-tree from top to bottom.

3. (2 points) Mark all that apply: A parser performs the following tasks in a compiler:
   (a) Detect syntax errors ✓
   (b) Detect semantic errors ⊗
   (c) Produce a parse tree ✓
   (d) Generate intermediate code ⊗

4. (2 points) Mark all that apply: Top-down parsers need to eliminate left-recursion from grammars:
   (a) to make the grammar more readable ⊗
   (b) to prevent the parser from going into an infinite loop ✓
   (c) to make it easier to build/implement the parser ⊗
   (d) to ensure that the multiple productions of a single non-terminal have disjoint ‘first’ tokens. ⊗

5. (2 points) Consider a language with the following tokens: a single right-associative operator ‘⊕’, and digits ‘0’-‘4’. Correct the following unambiguous grammar written for this language.

   \[
   E \rightarrow E \oplus D \mid D \\
   D \rightarrow 0 \mid 1 \mid 2 \mid 3 \mid 4 \\
   \]

6. (2 points) Eliminate immediate left recursion from the following grammar, as shown in class.

   \[
   \alpha = b c A \\
   \beta = a A c \\
   A \rightarrow b A c A' \\
   A' \rightarrow b c A A' \mid \epsilon \\
   \]