SECTION 1.1  Propositional Logic

4. a) Jennifer and Teja are not friends.
   b) There are not 13 items in a baker’s dozen. (Alternatively: The number of items in a baker’s dozen is not equal to 13.)
   c) Abby sent fewer than 101 text messages yesterday. Alternatively, Abby sent at most 100 text messages yesterday. Note: The first printing of this edition incorrectly rendered this exercise with “every day” in place of “yesterday.” That makes it a much harder problem, because the days are quantified, and quantified propositions are not dealt with until a later section. It would be incorrect to say that the negation in that case is “Abby sent at most 100 text messages every day.” Rather, a correct negation would be “There exists a day on which Abby sent at most 100 text messages.” Saying “Abby did not send more than 100 text messages every day” is somewhat ambiguous—do we mean \( \neg \forall \) or do we mean \( \forall \neg \)?
   d) 121 is not a perfect square.

18. a) This is \( \text{F} \rightarrow \text{F} \), which is true.
   b) This is \( \text{F} \rightarrow \text{F} \), which is true.
   c) This is \( \text{T} \rightarrow \text{F} \), which is false.
   d) This is \( \text{T} \rightarrow \text{T} \), which is true.

30. A truth table will need \( 2^n \) rows if there are \( n \) variables.
   a) \( 2^2 = 4 \)    b) \( 2^3 = 8 \)    c) \( 2^6 = 64 \)    d) \( 2^5 = 32 \)