1. For each statement below, indicate whether it is true or false:

   (a) If 2 + 2 = 4, then January has 31 days.
   (b) If 2 + 2 = 5, then January has 31 days.
   (c) If 2 + 2 = 4, then January has 30 days.

2. (a) Fill in the truth table below:

\[
\begin{array}{ccc}
 p & q & (p \land q) \rightarrow \neg p \\
 T & T & \\
 T & F & \\
 F & T & \\
 F & F & \\
\end{array}
\]

(b) Is it a tautology? Why or why not?

(c) Is it a contradiction? Why or why not?

3. Consider the three propositions below:

   - w: The printer is working.
   - i: The printer has run out of ink.
   - j: The printer has a paper jam.

Give a logical expression equivalent to the following English sentences:

(a) If the printer has run out of ink or has a paper jam then it is not working.

(b) The printer has run out of ink, but it is still working.

(c) The only way for the printer to not be working is for it to have a paper jam.