[1] (similar to suggested problem 1.1#16)
Write a truth table for the statement form \( p \lor (\neg q \land r) \).

[2] (similar to suggested problem 1.1#19) Is the statement form \( \neg(p \lor q) \) logically equivalent to the statement form \( \neg p \lor \neg q \)? Justify your answer using a truth table and some explanation.

[3] (similar to suggested problems 1.1#29) Using DeMorgan’s laws, find the negation of statement \( P: \text{Bob is green and George is red} \).

[4] (similar to suggested problem 1.1#35) Using DeMorgan’s laws, find the negation of statement \( Q: 5 \leq x < 6 \).

[5] (similar to suggested problem 1.1#42) Is the statement form \( (\neg p \lor q) \lor (p \land \neg q) \) a tautology, a contradiction, or neither? Justify your answer using a truth table and some explanation.

[6] (similar to suggested problem 1.2#7)
Construct a truth table for the statement form \( \neg p \lor q \rightarrow r \).

[7] (similar to suggested problems 1.2#15) Use truth tables to verify the following logical equivalences. Include a few words of explanation with your answers
(a) \( p \rightarrow q \equiv \neg p \lor q \)
(b) \( \neg(p \rightarrow q) \equiv (p \land \neg q) \)

[8] (similar to suggested problems 1.2#20, 22, 23)
Consider statement \( S \): If Ann is green, then Bob is red.
(a) In words, write the contrapositive of \( S \).
(b) In words, write the converse of \( S \).
(c) In words, write the inverse of \( S \).
(d) In words, write the negation of \( S \).

[9] (similar to suggested problem 1.2#33) Consider the following statement \( S \).
statement \( S \): You are an astronaut only if you are in excellent health.
The goal is to rewrite statement \( S \) as an if-then statement in two different ways. To do this, rewrite statement \( S \) in if-then form. Then, using the contrapositive, write a second version.

[10] (a) Give an example of a conditional statement \( A \) such that \( A \) is true and the converse of \( A \) is false.
(b) Give an example of a conditional statement \( B \) such that \( B \) is true and the converse of \( B \) is also true.