Exercise (Truth Tables)

1.) How many rows and columns (excluding atoms) does the truth table of

$$((p \vee \neg q) \rightarrow r) \wedge \neg s$$

have?

2.) Draw the truth table of $\neg r \rightarrow (q \wedge \neg p)$. Is the formula a tautology, contradiction or contingency?

3.) Draw the truth table of $\neg((p \wedge \neg q) \vee \neg p)$. Is the formula a tautology, contradiction or contingency?

4.) Suppose 'p' is true, 'q' is true, 'r' is false and 's' is false. Find the truth value of

$$\neg((s \vee p) \wedge (\neg r \vee \neg q))$$

5.) Draw the truth table of

$$(((\neg a \vee b) \wedge c) \leftrightarrow b) \rightarrow a$$

6.) Draw the truth table of $(\neg a \rightarrow \top) \leftrightarrow (\bot \vee b)$. Is it a tautology, contradiction or contingency?

7.) Draw the truth table of $(a \leftrightarrow \bot) \wedge (\top \leftrightarrow \neg b)$. Is it a tautology, contradiction or contingency?

8.) Draw the truth table of $\neg(P \rightarrow q) \rightarrow (P \wedge \neg q)$. Is it a tautology, contradiction or contingency?

9.) Draw the truth table of $\neg((\neg P \rightarrow q) \leftrightarrow (P \vee q))$. Is it a tautology contradiction or contingency?