Assignment #2

Use the Rules of Natural deduction given to you in class to prove the following tautologies (where P,Q,R, and B are statements)

1. $P \text{ or } P \Leftrightarrow P$
2. $B \text{ or } \sim B$
3. $\rightarrow\leftarrow\Rightarrow P$
4. $\sim P \text{ and } \left(P \text{ or } Q\right) \Rightarrow Q$
5. $\left(P \text{ and } Q\right) \Rightarrow \left(P \text{ or } Q\right)$
6. $\left(P \text{ or } Q\right) \text{ and } R \Rightarrow \left(P \text{ or } R\right) \text{ and } \left(Q \text{ or } R\right)$
7. $\left(\sim P \text{ or } \sim Q\right) \Rightarrow \sim\left(P \text{ and } Q\right)$
8. $P \text{ and } (Q \Rightarrow P) \Leftrightarrow P$