

### 2.41.1. Proof Problems

Construct a **proof** for each of the following sentences.

T 2.1.  $\sim(P \wedge \sim P)$

T 2.2.  $(P \vee \sim P)$

T 2.3.  $\sim(P \wedge \sim(P \vee P))$

T 2.4.  $(P \vee \sim(P \vee P))$

T 2.5.  $(P \vee (\sim P \vee \sim P))$

T 2.6.  $(P \vee (\sim P \vee Q))$

T 2.7.  $(\sim Q \vee (\sim P \vee Q))$

T 2.8.  $((P \vee Q) \vee \sim(P \wedge Q))$

T 2.9.  $((P \vee Q) \vee (\sim P \wedge \sim Q))$

T 2.10.  $((\sim(P \vee Q) \vee \sim(\sim P \vee Q)) \vee Q)$

T 2.11.  $(( (P \wedge Q) \vee (\sim P \wedge Q)) \vee \sim Q)$

T 2.12.  $(( (P \vee Q) \wedge (\sim P \vee Q)) \vee \sim Q)$

T 2.13.  $\sim((P \wedge Q) \vee (\sim P \wedge Q)) \wedge \sim Q)$

T 2.14.  $\sim((P \vee Q) \wedge (\sim P \vee Q)) \wedge \sim Q)$

T 2.15  $\sim((\sim P \vee \sim P) \wedge (P \vee (P \wedge Q)))$

T 2.16.  $(( (P \wedge Q) \vee (\sim P \wedge Q)) \vee ((P \wedge \sim Q) \vee (\sim P \wedge \sim Q)))$