

Construct a proof for the argument:  $\neg P \wedge \neg Q \therefore \neg(P \vee Q)$

|    |                        |                               |
|----|------------------------|-------------------------------|
| 1  | $\neg P \wedge \neg Q$ |                               |
| 2  | $\neg\neg(P \vee Q)$   |                               |
| 3  | $(P \vee Q)$           | 2, Double Negation            |
| 4  | $\neg P$               |                               |
| 5  | $Q$                    | 3, 4 Modus Tollendo<br>Ponens |
| 6  | $\neg P \wedge \neg Q$ | 1, Repeat                     |
| 7  | $\neg P$               | 6 Simplification              |
| 8  | $\neg Q$               | 6, Simplification             |
| 9  | $Q$                    | 5, Repeat                     |
| 10 | $P$                    | 4-9, Reductio Ad<br>Absurdum  |
| 11 | $\neg P \wedge \neg Q$ | 1 Repeat                      |
| 12 | $\neg P$               | 11 Simplification             |
| 13 | $P$                    | 10, Repeat                    |
| 14 | $\neg(P \vee Q)$       | 2-13, Reductio Ad<br>Absurdum |