MA 225 Worksheet 3 – 9/5

Complete the following list of logical equivalences. You may find the names of the equivalences, given in parentheses, to be useful as hints.

- (DeMorgan’s laws)
  \[ \neg(P \land Q) \text{ is equivalent to } \neg(P \lor Q) \]

- (commutativity)
  \[ P \land Q \text{ is equivalent to } P \lor Q \]

- (associativity)
  \[ P \land (Q \land R) \text{ is equivalent to } P \lor (Q \lor R) \]

- (idempotency)
  \[ P \land P \text{ is equivalent to } P \lor P \]

- (distributivity)
  \[ P \land (Q \lor R) \text{ is equivalent to } P \lor (Q \land R) \]

- (absorption)
  \[ P \land (P \lor Q) \text{ is equivalent to } P \lor (P \land Q) \]

- (double negation)
  \[ \neg\neg P \text{ is equivalent to } P \]