InClass Exercises – Week 8

(a) Construct a proposition/statement that is true precisely when:

1. p is true and q is false
2. p is false and q is false or when p is false and q is true
3. either p is false or q is true, and r is false

(b) Show that the statements below are tautologies and/or contradictions:

1. $((p \to q) \wedge (q \to r)) \to (p \to r)$
2. $\neg (p \wedge \neg p) \wedge (r \wedge \neg r)$

(c) Use the laws of equivalence to show that the below statements are logically equivalent:

1. $(p \wedge \neg q) \vee q \equiv p \vee q$
2. $\neg p \vee p \equiv p \wedge \neg p$