

Assignment #4-key

1a) $(\neg P \wedge Q) \checkmark$
 $\neg\neg(P \wedge Q) \checkmark$
 $(P \wedge Q) \checkmark$
 P
 Q
 $\neg P$
 Q
 *

The completed tree closes.
 So the argument is *tautologically valid*.

1b) P
 $\neg P$ The completed tree closes.
 $\neg Q$ So the argument is
 * *tautologically valid*.

1c) $(Q \vee \neg P) \checkmark$
 $\neg(Q \wedge \neg R) \checkmark$
 $(\neg R \vee \neg P) \checkmark$
 $\neg\neg P \checkmark$
 P
 \wedge
 Q $\neg P$
 \wedge *
 $\neg Q$ $\neg R$
 * \wedge
 $\neg R$ $\neg P$
 * *

The completed tree closes.
 So the argument is *tautologically valid*.

1d) $(\neg(P \vee Q) \vee \neg R) \checkmark$
 $(\neg R \vee \neg Q) \checkmark$
 $\neg(\neg Q \vee P) \checkmark$
 $\neg\neg Q \checkmark$
 $\neg P$
 Q
 \wedge
 $\neg(P \vee Q) \checkmark$ $\neg R$
 $\neg P$ \wedge
 $\neg Q$ $\neg R$ $\neg Q$
 * *

The completed tree has an open branch.
 So the argument is *tautologically invalid*.

2a) $\neg((\neg P \wedge Q) \supset \neg(P \wedge Q)) \checkmark$
 $(\neg P \wedge Q) \checkmark$
 $\neg\neg(P \wedge Q) \checkmark$
 $(P \wedge Q) \checkmark$
 $\neg P$
 Q
 P
 Q
 *

The tree for the negated wff is closed.
 So the negated wff is a contradiction.
 So the wff is a tautology.
 Hence the **PLC** argument that corresponds to it is *tautologically valid*.

2b) $\neg((P \wedge \neg P) \supset Q) \checkmark$
 $(P \wedge \neg P) \checkmark$
 $\neg Q$
 P
 $\neg P$
 *

The tree for the negated wff is closed.
 So the negated wff is a contradiction.
 So the wff is a tautology.
 Hence the **PLC** argument that corresponds to it is *tautologically valid*.