Prove the following derivations. Only basic and hypothetical rules are allowed.

1 $D \vdash A \to (B \to D)$

2 $B \wedge \neg B \vdash C$

Prove the following theorems using only basic and hypothetical rules.

1 $(A \to B) \to [\neg B \to \neg(A \wedge D)]$

Prove the following derivations. Only basic and hypothetical rules are allowed.

1 $(A \to B) \to \neg B \vdash \neg B$

2 $C \to K, A \to D \vdash \neg(A \vee C) \vee (K \vee D)$

Prove, using all available rules, that the following pairs of sentences are logically equivalent.

1 $A \vee (B \leftrightarrow C), A \vee (\neg B \leftrightarrow \neg C)$

Prove the following theorem(s) using all available rules

1 $[L \to (M \to N)] \to [(L \to M) \to (L \to N)]$