Homework 7, part 1 (to be handed on Tuesday 14 April, 11 am)

1. * Give nice conditions on φ and ψ (reducing the use of $|$) such that

   (a) $\neg\varphi|\neg\varphi$,

   (b) $\varphi \vee \psi | \varphi \vee \psi$,

   (c) $\varphi \wedge \psi | \varphi \wedge \psi$,

   (d) $\varphi \rightarrow \psi | \varphi \rightarrow \psi$.

   In one of the cases you will not be able to get a nice condition.

   [4 pts]

2. (a) Show Corollary 23 (1) (completely, even if in class we did some of the steps). [2 steps]

   (b) Show how Corollary 23 (2) follows from Corollary 23 (1). [2 pts]

   (c) Show, using the Aczel slash, that

   $$\text{If } \vdash_{\mathbf{IPC}} (\varphi \rightarrow \psi) \rightarrow (\chi \vee \theta), \text{ then}$$

   $$\vdash_{\mathbf{IPC}} (\varphi \rightarrow \psi) \rightarrow \chi \text{ or } \vdash_{\mathbf{IPC}} (\varphi \rightarrow \psi) \rightarrow \theta \text{ or } \vdash_{\mathbf{IPC}} (\varphi \rightarrow \psi) \rightarrow \varphi.$$

   [2 pts]