

4. Some Nice Patterns

L. For each of the following, say whether it is equivalent to ϕ , equivalent to T, equivalent to F, or not equivalent to any of these.

- (a) $(\phi \vee F) \rightarrow \phi$
- (b) $(\phi \wedge F) \rightarrow F$
- (c) $(\phi \wedge T) \rightarrow \phi$
- (d) $(T \vee F) \rightarrow T$
- (e) $(T \wedge F) \rightarrow F$

M. For each of the following, say whether it is equivalent to r, equivalent to 1, equivalent to 0, or not equivalent to any of these. Note to self: 0 = empty set. 1 = set of one element, namely the empty string. S union, |, empty set = S. S concatenate . empty set = empty set

- (a) $(r \mid 0) \rightarrow r$
- (b) $(r \cdot 0) \rightarrow 0$
- (c) $(r \cdot 1) \rightarrow r$
- (d) $(1 \mid 0) \rightarrow 1$
- (e) $(1 \cdot 0) \rightarrow 0$