Useful equivalent transformations

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1 Equivalent transformations

Let $\square$ be the formula which is always false, $\blacksquare$ the formula which is always true.
We have the followings:

$$F \Longleftrightarrow G \;=\; (F \Rightarrow G) \wedge (G \Rightarrow F)$$
$$F \Rightarrow G \;=\; \neg F \vee G$$

$F \vee G \;=\; G \vee F$	$F \wedge G \;=\; G \wedge F$	(comutativity)
$F \vee (G \vee H) \;=\; (F \vee G) \vee H$	$F \wedge (G \wedge H) \;=\; (F \wedge G) \wedge H$	(associativity)
$F \vee (G \wedge H) \;=\; (F \vee G) \wedge (F \vee H)$	$F \wedge (G \vee H) \;=\; (F \wedge G) \vee (F \wedge H)$	(distributivity)
$F \wedge F = F$	$F \vee F = F$	
$F \vee \square \;=\; F$	$F \wedge \blacksquare \;=\; F$	
$F \vee \blacksquare \;=\; \blacksquare$	$F \wedge \square \;=\; \square$	
$F \vee \neg F \;=\; \blacksquare$	$F \wedge \neg F \;=\; \square$	
$\neg(\neg F) \;=\; F$		
$\neg(F \vee G) \;=\; \neg F \wedge \neg G$	$\neg(F \wedge G) \;=\; \neg F \vee \neg G$	(de Morgan)