

Some logic and some sets

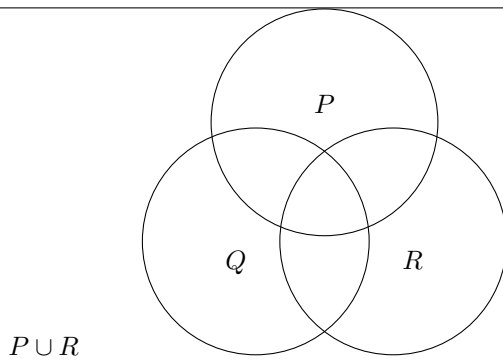
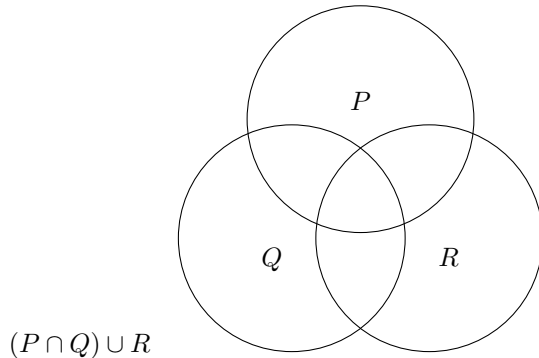
We are going to prove the distributive law

$$(P \wedge Q) \vee R \iff (P \vee R) \wedge (Q \vee R)$$

1. One way is with truth tables:

P	Q	R	$P \wedge Q$	$(P \wedge Q) \vee R$	$P \vee R$	$Q \vee R$	$(P \vee R) \wedge (Q \vee R)$
T	T	T					
T	T	F					
T	F	T					
T	F	F					
F	T	T					
F	T	F					
F	F	T					
F	F	F					

2. Another way is with Venn diagrams. Fill in:



Convince yourself from these pictures that

$$(P \cap Q) \cup R = (P \cup R) \cap (Q \cup R)$$

