Logic precept 1

Review basic concepts

True/False?

1. Any argument with true premises and true conclusion must be valid.
2. No valid argument can have false premises and a true conclusion.
3. Any sound argument has a true conclusion.
4. All valid arguments are sound arguments.

Symbolize

ϕ and ψ	$\phi \wedge \psi$	conjunction
ϕ or ψ	$\phi \vee \psi$	disjunction
If ϕ then ψ	$\phi \rightarrow \psi$	conditional
It is not the case that ϕ	$\neg\phi$	negation

1. Princeton stops early admission only if Harvard stops early admission.

2. If Harvard or Yale cancels in person classes, then Princeton cancels in person classes.

3. Neither Harvard nor Yale cancels in person classes.

4. Princeton holds in person classes unless the CDC issues a warning.

Deduce

Rules: for sentences of interlocking forms $F_1, F_2, \ldots, F_n$, one is permitted to infer a sentence of form G

Question: What forms do each of the following sentences have?

1. $P \to Q, P \vdash Q \vee R$
2. $(A \vee B) \to T, Z \to A, T \to W, Z \vdash W$
3. $P \wedge (P \to Q) \vdash P \wedge Q$
4. $\neg P \to Q, \neg Q \vdash P \vee R$
5. $(P \wedge Q) \to R, P \to Q, P \vdash R$
6. $(P \wedge P) \to Q, P \vdash Q$
7. $P \to Q, P \vdash P \wedge Q$