LOGIC: VERIFYING ARGUMENTS [PIRNOT 3.4]

EX 3.4.2: (a) What is the form of the following argument? (b) Is the argument valid?

If my Internet connection is broken, then my day is ruined. $P \longrightarrow Q$

My day is not ruined. $\Longleftrightarrow$ $\sim Q$

∴ My Internet connection is not broken. ∴ $\sim P$

(a) Law of Contraposition (b) Yes (since the Law of Contraposition is always a valid argument)

EX 3.4.3: (a) What is the form of the following argument? (b) Is the argument valid?

If my Internet connection is broken, then my day is ruined. $P \longrightarrow Q$

My day is ruined. $\Longleftrightarrow$ Q

∴ My Internet connection is broken. ∴ P

(a) Fallacy of the Converse (b) No (since fallacies are never valid arguments)

EX 3.4.6: Using a truth table, determine whether the following argument is valid or invalid:

$$\sim P$$
$$P \longrightarrow Q$$
$$\therefore \sim Q \ \wedge P$$

Build truth table with variables $[P, Q]$, intermediate expressions $[\sim Q]$, premises $[\sim P, P \longrightarrow Q]$, and conclusion $[\sim Q \wedge P]$:

P	Q	$\sim Q$	$\sim P$	$P \longrightarrow Q$	$\sim Q \wedge P$
			PREMISES		**CONCLUSION**
T	T	F	F	T	F
T	F	T	F	F	T
F	T	F	**T**	**T**	**F**
F	F	T	**T**	**T**	**F**

There's at least one row where the premises are all true but the conclusion is false (**bolded** entries in bottom two rows).

∴ Argument is **invalid**