

2.3 Valid and Invalid Arguments

p.61 #6-11, 22-32, 36-40, 42-44

⑥

premises		conclusion	
P	q	$P \rightarrow q$	$q \rightarrow r$
T	T	T	T
T	F	F	—
F	T	T	F
F	F	T	T

$P \vee q$

(F)

The argument is invalid. In row 4, the premises are true but the conclusion is false.

⑦

P	q	r	$P \rightarrow q$	$\sim q \vee r$	r
T	T	T	T	T	T
T	T	F	T	F	—
T	F	T	F	—	—
T	F	F	F	—	—
F	—	—	—	—	—
F	—	—	—	—	—
F	—	—	—	—	—

The argument is valid.

⑧

P	q	r	$P \vee q$	$P \rightarrow \sim q$	$P \rightarrow r$	r
T	T	T	T	F	—	—
T	T	F	T	F	—	—
T	F	T	T	T	T	T
T	F	F	T	T	F	—
F	T	T	T	T	T	T
F	F	T	F	T	T	(F)
F	F	F	F	—	—	—

The argument is invalid. See row 6.

⑨

P	q	r	$P \wedge q \rightarrow \sim r$	$P \vee \sim q \rightarrow P$	$\sim r$
T	T	T	F	—	T
T	T	F	T	T	(F)
T	F	T	T	T	T
T	F	F	T	T	T
F	T	T	T	F	—
F	F	T	T	F	—
F	F	F	T	F	—

The argument is invalid. See row 3.

⑩

P	q	r	$P \rightarrow q$	$q \rightarrow r$	$P \vee q \rightarrow r$
T	T	T	T	T	T
T	T	F	F	F	—
T	F	T	F	—	—
T	F	F	F	—	—
F	T	T	T	T	T
F	T	F	T	F	—
F	F	T	T	T	T
F	F	F	T	T	T

The argument is valid.

⑪

P	q	r	$P \rightarrow q \vee r$	$\sim q \vee \sim r$	$\sim P \vee \sim r$
T	T	T	T	F	—
T	T	F	T	T	(F)
T	F	T	T	T	—
T	F	F	F	—	—
F	T	T	T	F	—
F	T	F	T	T	T
F	F	T	T	T	T
F	F	F	T	T	T

The argument is invalid. See row 3.

⑫ $\sim A \rightarrow B$

$\sim B \rightarrow A$

$\therefore \sim A \vee \sim B$

A	B	$\sim A \rightarrow B$	$\sim B \rightarrow A$	$\sim A \vee \sim B$
T	T	T	T	(F)
T	F	T	T	T
F	T	T	T	T
F	F	F	—	—

The argument is invalid. See row 1.

⑬ $j \vee e$

$j \rightarrow m$

$\therefore e \vee \sim m$

j	e	m	$j \vee e$	$j \rightarrow m$	$e \vee \sim m$
T	T	T	T	T	T
T	T	F	T	F	(F)
T	F	T	T	T	—
T	F	F	T	F	—
F	T	T	T	T	T
F	T	F	T	T	T
F	F	T	F	—	—
F	F	F	F	—	—

The argument is invalid. See row 3.

24) $c \rightarrow t$
 t Invalid. Converse error.
 $\therefore c$

25) $r \vee i$
 $\sim r$ Valid. Elimination.
 $\therefore i$

26) $m \rightarrow \sim h$
 $\sim h \rightarrow \sim e$ Valid. Transitivity.
 $\therefore m \rightarrow \sim e$

27) $t \rightarrow f$
 $\sim t$ Invalid. Inverse error.
 $\therefore \sim f$

28) $e \rightarrow i$
 i Invalid. Converse error.
 $\therefore e$

29) $d \rightarrow p$
 $\sim d$ Invalid. Inverse error.
 $\therefore \sim p$

30) $c \rightarrow o$
 o Invalid. Converse error.
 $\therefore c$

31) $j \wedge c$
 $\therefore c$ Valid. Specialization.

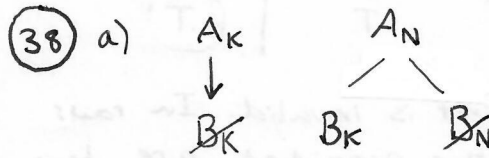
32) $b \rightarrow s$
 $m \rightarrow s$ Valid. Modus Ponens.
 $\therefore b \vee m \rightarrow s$

36) $u \vee x$
 $x \rightarrow s \vee m$
 $\sim s$
 $\sim m$
 $\therefore u$

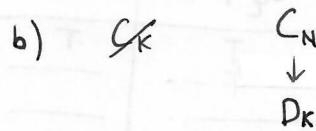
There is an undeclared variable.

37) $L \rightarrow \sim K$
 $E \rightarrow K$
 L
 $E \vee F$
 $O \rightarrow G$
 $\therefore F$

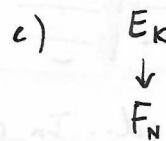
The treasure is buried under the flagpole.



A: Knave
 B: Knight



C: Knave
 D: Knight



E: Knight
 F: Knave

d) U: If knight, contradiction.
 $\hookrightarrow U: \text{Knave}$
 $Z_K \rightarrow W_N$
 $\hookrightarrow Z: \text{Knave}$

$Y_K - X_N - W_K - V_N - \checkmark$

K: {W, Y}

N: {U, V, X, Z}

