

# SYMBOLIC ARGUMENTS

TEXT: 2.7

LAST NAME	FIRST NAME	DATE
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1 (4 points). Use a truth table to determine whether the following argument is valid:

$$\begin{array}{l} a \rightarrow b \\ (\sim a) \leftrightarrow b \\ \hline \therefore b \rightarrow a \end{array}$$


2 (4 points). Use a truth table to determine whether the following argument is valid:

$$\begin{array}{l} a \leftrightarrow b \\ \sim (a \vee b) \\ \hline \therefore a \wedge (\sim a) \end{array}$$


3 (6 points). Rewrite the argument in symbolic form, then use a truth table to determine whether the argument is valid:

If I am a hound wolf, then I howl at the moon.  
I do not howl at the moon.

Therefore, I am not a hound wolf.

$a$  = I am a hound wolf

$b$  = I howl at the moon

Symbolic form:




5 (6 points). Use a truth table to determine whether the following argument is valid:

$$\begin{array}{l} \sim c \\ c \vee (\sim a) \\ b \rightarrow a \\ \hline \therefore (\sim b) \rightarrow c \end{array}$$


## PROBLEMS WITH ANSWERS.

Use the indicated letters to write the argument in symbolic form. Then use a truth table to determine whether the argument is valid or invalid. Note that you can find many websites online that will construct truth tables for you, which is a great way to check these answers.

1. If the winds are from the east [e], then we will not have a big surf [s]. We do not have a big surf. Therefore, the winds are from the east.

Symbolic form:


2. If I have the music [m], then I have the rhythm [r]. If I have the rhythm, then I have the music. Therefore, I have both the music and the rhythm.

Symbolic form:






5. Determine whether the argument is valid.

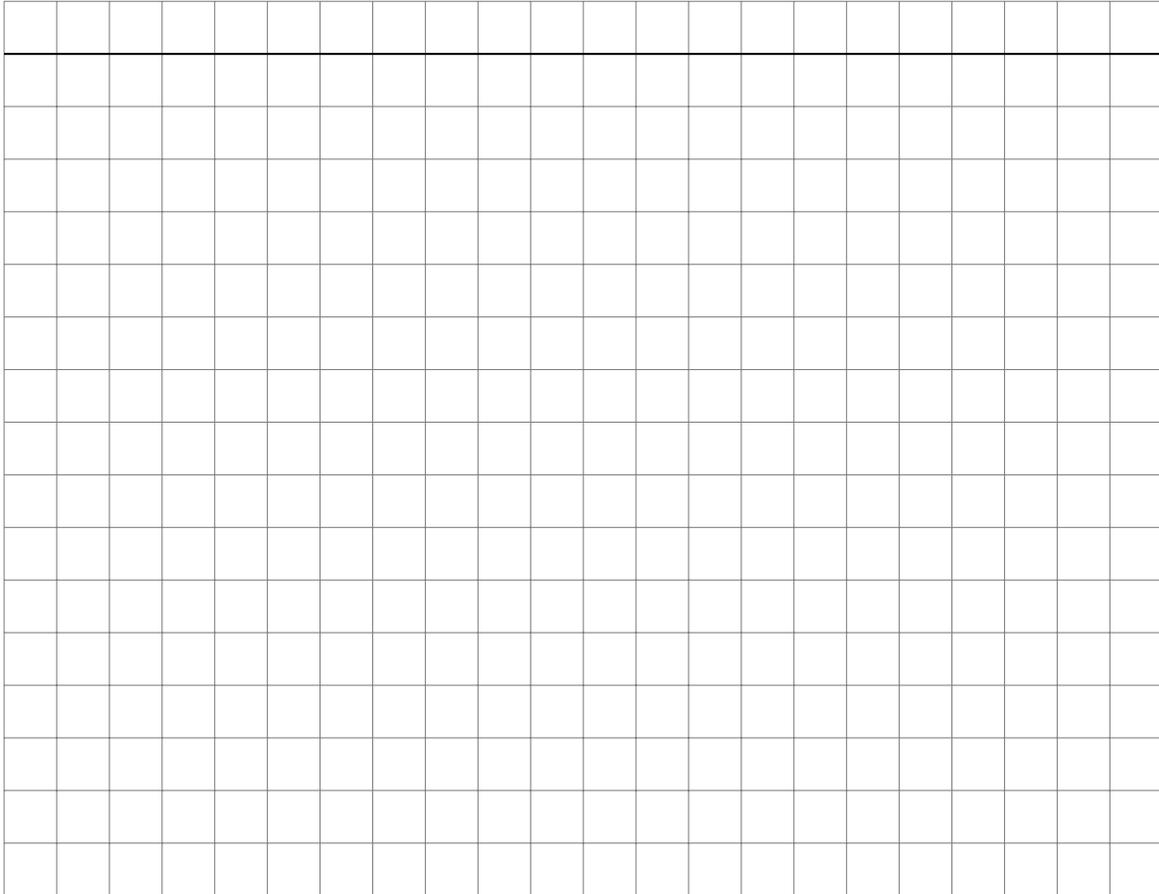
$$b \rightarrow i$$

$$m \rightarrow (\sim d)$$

$$i \rightarrow d$$

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$$\therefore b \rightarrow (\sim m)$$





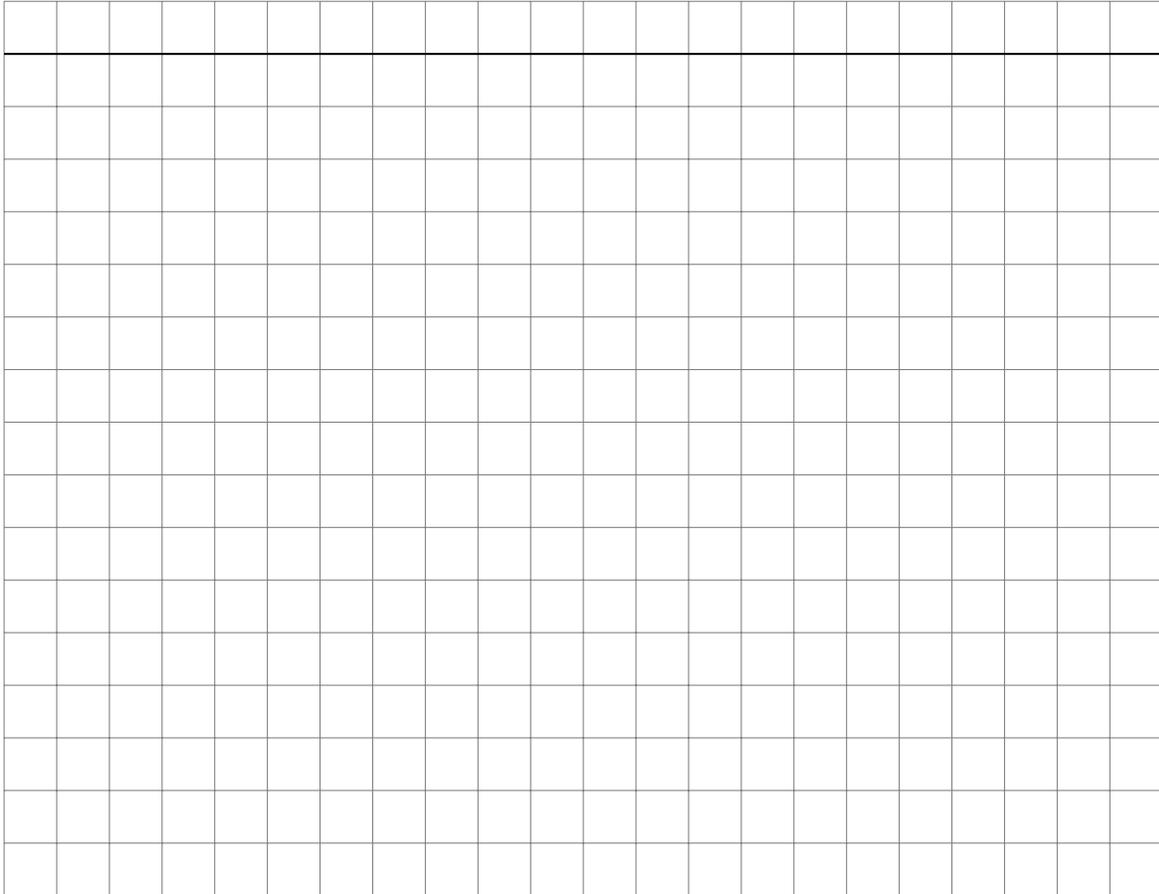
7. Determine whether the argument is valid.

$$P \vee Q$$

$$P \rightarrow R$$

$$Q \rightarrow S$$

$$\hline \therefore R \rightarrow S$$





# ANSWERS.

1.

Argument in symbolic form:

$$\begin{array}{l} e \rightarrow (\sim s) \\ \sim s \\ \hline \therefore e \end{array}$$

Truth table:

$e$	$s$	$e \rightarrow (\sim s)$	$\sim s$	$e$
T	T	F	F	T
T	F	T	T	T
F	T	T	F	F
F	F	T	T	F

← Invalid

3.

Argument in symbolic form:

$$\begin{array}{l} a \vee c \\ a \rightarrow m \\ c \rightarrow m \\ \hline \therefore m \end{array}$$

Truth table:

$a$	$c$	$m$	$a \vee c$	$a \rightarrow m$	$c \rightarrow m$	$m$
T	T	T	T	T	T	T
T	T	F	T	F	F	F
T	F	T	T	T	T	T
T	F	F	T	F	T	F
F	T	T	T	T	T	T
F	T	F	T	T	F	F
F	F	T	F	T	T	T
F	F	F	F	T	T	F

The argument is valid.

5. Valid

6. Invalid

7. Invalid

8. Valid