

SYMBOLIC ARGUMENTS HOMEWORK

TEXT: 2.7

LAST NAME	FIRST NAME	DATE
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1. Rewrite the argument in symbolic form, then use a truth table to determine whether the argument is valid:

I will buy a new car or a used truck.

If I buy both a new car and a used truck, I will need a loan.

I will buy a used truck and I won't need a loan.

Therefore, I won't buy a new car.

a = I will buy a new car

b = I will buy a used truck

c = I will need a loan

Symbolic form:

2. Use a truth table to determine whether the following argument is valid:

$$\sim c$$

$$c \vee (\sim a)$$

$$b \rightarrow a$$

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

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.

3. 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:

4. 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:

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.

5. Rio will buy fresh apples [a] or fresh cherries [c]. Rio will buy fresh apples only if she goes to the farmers market [m]. If Rio wants to buy fresh cherries, she likewise needs to go to the farmers market. Therefore, Rio will go to the farmers market.

Symbolic form:

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.

6. If I go to the mall [m], then I will buy new jeans [j]. If I buy new jeans, then I will buy a shirt to match [s]. Therefore, if I don't go to the mall, then I will not buy a shirt.

Symbolic form:

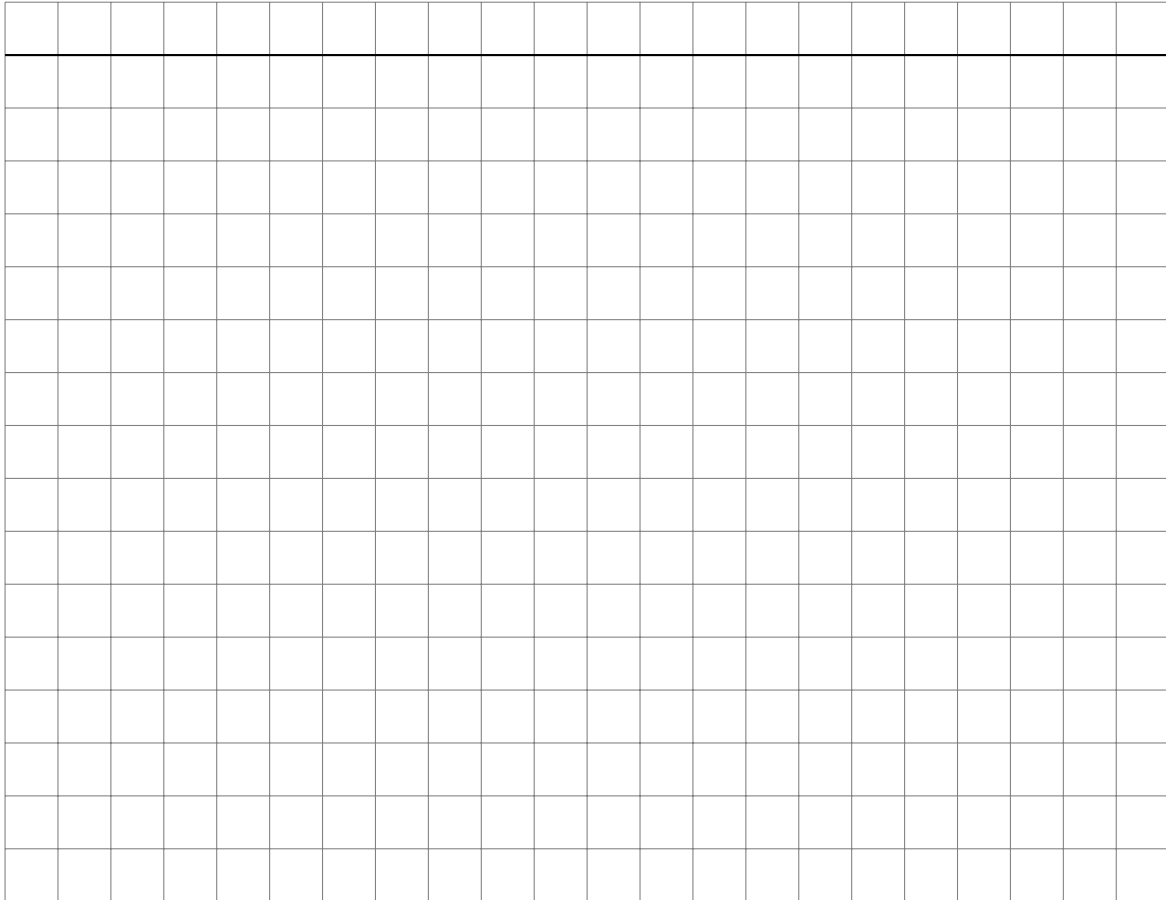
7. Determine whether the argument is valid.

$$b \rightarrow i$$

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

$$i \rightarrow d$$

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



8. Determine whether the argument is valid.

$$h \vee (\sim w)$$

$$p \vee q$$

$$\underline{w \wedge (\sim p)}$$

$$\therefore h \wedge q$$

A full-page sheet of white graph paper. The grid consists of thin, light gray horizontal and vertical lines forming small squares. A single, slightly thicker dark gray horizontal line runs across the top of the page, approximately one-fifth of the way down from the top edge. The rest of the page is filled with the standard grid pattern.

9. Determine whether the argument is valid.

$$P \vee Q$$

$$P \rightarrow R$$

$$Q \rightarrow S$$

$$\therefore R \rightarrow S$$

[illegible]

10. Determine whether the argument is valid.

$$a \leftrightarrow (\sim b)$$

$$(a \rightarrow b) \rightarrow c$$

$$\frac{c \rightarrow (b \vee a)}{\therefore c \vee a}$$

ANSWERS

1.

Argument in symbolic form:

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

Truth table:

a	b	c	$a \vee b$	$(a \wedge b) \rightarrow c$	$b \wedge (\sim c)$	$\sim a$
T	T	T	T	T	F	F
T	T	F	T	F	T	F
T	F	T	T	T	F	F
T	F	F	T	T	F	F
F	T	T	T	T	F	T
F	T	F	T	T	T	T
F	F	T	F	T	F	T
F	F	F	F	T	F	T

The argument is valid.

3.

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

The argument is invalid.

5.

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.

7. Valid

8. Invalid

9. Invalid

10. Valid