1. Identify the quantifier in the following statement as either universal or existential.

All cows eat grass.

A. Existential

B. Universal

2. Determine if the following sentence is a statement or not. $2 + 2 = 4$

A. Is a statement.

B. Not a statement.

3. Let p be the statement "Billy Bob is a chemistry major," and q be the statement "Linda Lou is a Physics major." Write the following statements in symbols.

If Billy Bob is a chemistry major, then Linda Lou is a Physics major.

A. $\sim (p \vee q)$

B. $\sim q$

C. $p \rightarrow q$

D. $\sim q \rightarrow p$

E. $p \wedge q$

F. $\sim p$

G. $q \leftrightarrow p$

4. Fill in the missing values of the following truth table:

p	q	$p \rightarrow q$
T	T	
T	F	
F	T	
F	F	

A.

$p \rightarrow q$
T
T
F
T

B.

$p \rightarrow q$
T
F
T
F

C.

$p \rightarrow q$
T
T
T
T

D.

$p \rightarrow q$
T
F
T
T

E.

$p \rightarrow q$
T
T
T
F

F.

$p \rightarrow q$
T
T
F
F

G.

$p \rightarrow q$
T
F
F
T

H.

$p \rightarrow q$
T
F
F
F

5. Fill in the missing values of the following truth table. Note: You may need to include more columns in your truth table to decide the truth values in the right-most column below.

p	q	r	$(\sim p \lor \sim q) \to \sim r$
T	T	T	
T	T	F	
T	F	T	
T	F	F	
F	T	T	
F	T	F	
F	F	T	
F	F	F	

A.

$(\sim p \lor \sim q) \to \sim r$
T
T
T
T
T
T
T
T

B.

$(\sim p \lor \sim q) \to \sim r$
T
T
T
F
F
F
T
F

C.

$(\sim p \lor \sim q) \to \sim r$
T
F
T
F
T
F
F
F

D.

$(\sim p \lor \sim q) \to \sim r$
T
T
F
F
T
F
F
F

MORE OPTIONS ON NEXT PAGE...

$(\sim p \vee \sim q) \rightarrow \sim r$
T
T
F
T
F
F
F
F

E.

$(\sim p \vee \sim q) \rightarrow \sim r$
T
F
T
T
F
F
T
T

F.

$(\sim p \vee \sim q) \rightarrow \sim r$
T
T
T
T
F
T
T
T

G.

$(\sim p \vee \sim q) \rightarrow \sim r$
T
T
F
T
F
T
F
T

H.

6. Write the inverse of the statement $(p \lor \sim q) \to r$.

A. $\sim (p \lor \sim q) \to \sim r$

B. $\sim r \to \sim (p \lor \sim q)$

C. $r \to (p \lor \sim q)$

7. The two statements $p \vee (\sim q \wedge r)$ and $(p \wedge \sim q) \vee (p \wedge r)$ are

A. neither logically equivalent nor negations.

B. logically equivalent.

C. negations.

8. Use De Morgan's laws to write the negation of the following statement:

The patient is septic or she is in shock.

A. The patient is not septic and is in shock.

B. The patient is not septic or is not in shock.

C. The patient is septic or is in shock.

D. The patient is septic or is not in shock.

E. The patient is septic and is in shock.

F. The patient is not septic or is in shock.

G. The patient is septic and is not in shock.

H. The patient is not septic and is not in shock.

9. Use a truth table to decide if the following argument is valid.

$$\sim p \vee q$$
$$\frac{q \to \sim p}{\therefore p}$$

A. Valid

B. Invalid

10. Use a truth table to decide if the following argument is valid.

$$p \leftrightarrow q$$
$$q \leftrightarrow r$$
$$\overline{\therefore p \wedge q}$$

A. Invalid

B. Valid

Answers

1. B.

2. A.

3. C.

4. D.

5. H.

6. A.

7. A.

8. H.

9. B.

10. A.