Review 2b Logic
MGF 1106

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Express the symbolic statement ~p in words.

1) p: Some athletes are musicians. 1) _____

A) No athlete is a musician.
B) All athletes are musicians.
C) Some athletes are not musicians.
D) Not all athletes are musicians.

Construct a truth table for the statement.

2) $\sim q \vee (\sim p \vee q)$ 2) _____

A)

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

B)

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

C)

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

D)

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

Let p represent a true statement and let q represent a false statement. Find the truth value of the given compound statement.

3) $p \wedge q$ 3) _____

A) True
B) False

4) $\sim[(\sim p \wedge \sim q) \vee \sim q]$ 4) _____

A) True
B) False

Let p represent a true statement, while q and r represent false statements. Find the truth value of the compound statement.

5) $\sim(\sim p \wedge \sim q) \vee (\sim r \vee \sim p)$ 5) _____

A) True
B) False

6) $\sim(p \wedge q) \wedge (r \vee \sim q)$ 6) _____

A) True
B) False

Write the negation of the quantified statement. (The negation should begin with "all," "some," or "no.")

7) Some mammals are horses. 7) _____

A) Not all mammals are horses.
B) No horses are mammals.
C) All horses are mammals.
D) No mammals are horses.

8) No South American soccer teams have won a World Cup. 8) _____

A) All South American soccer teams have not won a World Cup.
B) All South American soccer teams have won a World Cup.
C) Some South American soccer teams have not won a World Cup.
D) Some South American soccer teams have won a World Cup.

9) All athletes are famous. 9) _____

A) Some athletes are not famous. B) All athletes are not famous.

C) All athletes are somewhat famous. D) Some athletes are famous.

Express the symbolic statement ~p in words.

10) p: No fifth graders play soccer. 10) _____

A) No fifth grader does not play soccer. B) All fifth graders play soccer.

C) At least one fifth grader plays soccer. D) Not all fifth graders play soccer.

Given that p and q each represents a simple statement, write the indicated compound statement in its symbolic form.

11) p: She drives at 80 mph. 11) _____

q: She gets a speeding ticket.

She drives at 80 mph or she gets a speeding ticket.

A) $p \rightarrow q$ B) $p \vee q$ C) $p \vee \sim q$ D) $p \wedge q$

12) p: He works out. 12) _____

q: He builds up his strength.

He works out or he does not build up his strength.

A) $p \vee q$ B) $p \vee \sim q$ C) $p \wedge \sim q$ D) $p \nrightarrow q$

13) p: The outside humidity is high. 13) _____

q: The basement dehumidifier is running.

r: The basement is getting moldy.

The outside humidity is high and the basement dehumidifier is running, or the basement is getting moldy.

A) $(p \wedge q) \vee r$ B) $p \wedge (q \vee r)$ C) $(p \wedge q) \nrightarrow r$ D) $p \wedge q \vee r$

Given that p and q each represents a simple statement, write the indicated symbolic statement in words.

14) p: The car has been repaired. 14) _____

q: The kids are home.

r: We will visit Aunt Tillie.

$(p \wedge q) \rightarrow r$

A) If the car has been repaired, we will visit Aunt Tillie even if the kids are not home.

B) We will visit Aunt Tillie if and only if the car has been repaired and the kids are home.

C) If the car has been repaired or the kids are home, we will visit Aunt Tillie.

D) If the car has been repaired and the kids are home, we will visit Aunt Tillie.

15) p: The car has been repaired. 15) _____

q: The kids are home.

r: We will visit Aunt Tillie.

$p \wedge (q \rightarrow r)$

A) The car has been repaired and the kids are home, so we will visit Aunt Tillie.

B) If the car has been repaired or the kids are home, we will visit Aunt Tillie.

C) If the car has been repaired, we will visit Aunt Tillie if the kids are home.

D) The car has been repaired, and we will visit Aunt Tillie if the kids are home.

Write the statement in symbolic form to determine the truth value for the statement.

16) 2 + 8 = 10 and 4 is an odd number. 16) _____

A) True B) False

17) $3 \times 6 = 18$ or Spanish is a language. 17) _____

A) True

B) False

Construct a truth table for the statement.

18) $\sim(q \nrightarrow p)$ 18) _____

A)

p	q	~ p	q ↛ p	~(q ↛ p)
T	T	F	F	T
T	F	F	T	F
F	T	T	T	F
F	F	T	T	F

B)

p	q	~ p	q ↛ p	~(q ↛ p)
T	T	F	F	T
T	F	F	T	F
F	T	T	T	T
F	F	T	T	F

C)

p	q	~ p	q ↛ p	~(q ↛ p)
T	T	F	T	F
T	F	F	F	T
F	T	T	F	T
F	F	T	F	T

D)

p	q	~ p	q ↛ p	~(q ↛ p)
T	T	F	F	T
T	F	F	F	T
F	T	T	T	F
F	F	T	T	F

Construct a truth table for the given statement.

19) $\sim p \leftrightarrow q$ 19) _____

A)

p	q	~ p	~ q	~ p ↔ q
T	T	F	F	T
T	F	F	T	F
F	T	T	F	T
F	F	T	T	T

B)

p	q	~ p	~ q	~ p ↔ q
T	T	F	F	T
T	F	F	T	F
F	T	T	F	F
F	F	T	T	T

C)

p	q	~ p	~ q	~ p ↔ q
T	T	F	F	T
T	F	F	T	T
F	T	T	F	T
F	F	T	T	T

D)

p	q	~ p	~ q	~ p ↔ q
T	T	F	T	F
T	F	F	T	F
F	T	T	F	F
F	F	T	T	T

20) $\sim (p \leftrightarrow q)$ 20) _____

A)

p	q	~ q	p ↔ q	~ (p ↔ q)
T	T	F	F	T
T	F	T	T	T
F	T	F	T	T
F	F	T	F	T

B)

p	q	~ q	p ↔ q	~ (p ↔ q)
T	T	F	F	T
T	F	T	T	F
F	T	F	T	F
F	F	T	T	F

C)

p	q	~ q	p ↔ q	~ (p ↔ q)
T	T	F	F	T
T	F	T	T	F
F	T	F	T	F
F	F	T	F	T

D)

p	q	~ q	p ↔ q	~ (p ↔ q)
T	T	F	T	F
T	F	T	F	T
F	T	F	F	T
F	F	T	T	F

Write the contrapositive of the statement.

21) If I am in the city of Grominia, then I am on the planet Plochus. 21) _____

A) If I am not in the city of Grominia, then I am on the planet Plochus.
B) If I am not in the city of Grominia, then I am not on the planet Plochus.
C) If I am not on the planet Plochus, then I am not in the city of Grominia.
D) If I am not on the planet Plochus, then I am in the city of Grominia.

22) If he is not working in China, then he is vacationing in England. 22) _____

A) If he is vacationing in China, then he is not working in England.
B) If he is not vacationing in China, then he is working in England.
C) If he is working in China, then he is not vacationing in England.
D) If he is not vacationing in England, then he is working in China.

Write the converse and inverse of the statement.

23) If it is spring, then some people go hiking. 23) _____

A) converse: If some people go hiking, then it is spring
inverse: If it is not spring, then no one goes hiking.
B) converse: If some people go hiking, then it is spring
inverse: If it is not spring, then everyone goes hiking.
C) converse: If some people do not go hiking, then it is not spring
inverse: If it is not spring, then everyone goes hiking.
D) converse: If some people do not go hiking, then it is not spring
inverse: If it is not spring, then no one goes hiking.

Use the De Morgan law that states:

$\sim(p \wedge q)$ is equivalent to $\sim p \vee \sim q$

to write an equivalent English statement for the statement.

24) It is not true that condors and rabbits are both birds. 24) _____

A) condors are not birds or rabbits are not birds.
B) rabbits are not birds, but condors are.
C) Neither condors nor rabbits are birds.
D) condors are birds or rabbits are birds.

Use De Morgan's laws to write a negation of the statement.

25) A man eats six hot dogs and he does not get a stomach ache. 25) _____

A) A man does not eat six hot dogs or he gets a stomach ache.
B) A man eats six hot dogs or he gets a stomach ache.
C) A man eats six hot dogs and he gets a stomach ache.
D) A man does not eat six hot dogs or he does not get a stomach ache.