You need Scantron 882E. Please use a pencil to mark the answers. Make sure your Scantron is clean, flat, and not folded when you submit.

Decide whether or not the following is a statement.

1) $8 + 5 = 14$
   A) Not a statement
   B) Statement

2) Not all flowers are roses.
   A) Not a statement
   B) Statement

3) My favorite baseball team will win the pennant.
   A) Not a statement
   B) Statement

4) This test is too hard.
   A) Statement
   B) Not a statement

5) Do you like this color?
   A) Not a statement
   B) Statement

Decide whether the statement is compound.

6) Computers are very helpful to people.
   A) Compound
   B) Not compound

7) $\sqrt{5}$ is rational and $\sqrt{6}$ is irrational.
   A) Not compound
   B) Compound

8) $21 + 26 \neq 52$
   A) Not compound
   B) Compound

9) If Rosa doesn’t get up, then Ralph will be late for school.
   A) Not compound
   B) Compound

Write a negation for the statement.

10) She earns more than me.
    A) She earns less than me.
    B) She does not earn less than me.
    C) She earns the same as me.
    D) She does not earn more than me.

11) Not all people like football.
    A) Some people do not like football.
    B) Some people like football.
    C) All people like football.
    D) All people do not like football.

12) Everyone is asleep.
    A) Everyone is awake.
    B) Nobody is awake.
    C) Nobody is asleep.
    D) Not everyone is asleep.

13) Some athletes are musicians.
    A) All athletes are musicians.
    B) Some athletes are not musicians.
    C) No athlete is a musician.
    D) Not all athletes are musicians.
14) No fifth graders play soccer.
   A) No fifth grader does not play soccer.  
   C) Not all fifth graders play soccer.  
   D) At least one fifth grader plays soccer.

15) Some people don’t like walking.
   A) Some people like walking.  
   B) Everyone likes walking.  
   C) Nobody likes walking.  
   D) Some people don’t like driving.

Convert the symbolic compound statement into words.

16) $p$ represents the statement "Her name is Lisa."
    $q$ represents the statement "She lives in Chicago."
    Translate the following compound statement into words:
    $\neg p$
    A) Her name is not Lisa.  
    C) It is true her name is Lisa.  
    D) She does not live in Chicago.

17) $p$ represents the statement "Her name is Lisa."
    $q$ represents the statement "She lives in Chicago."
    Translate the following compound statement into words:
    $p \land q$
    A) Her name is Lisa and she lives in Chicago.  
    B) Her name is Lisa and she doesn’t live in Chicago.  
    C) If her name is Lisa, she lives in Chicago.  
    D) Her name is Lisa or she lives in Chicago.

18) $p$ represents the statement "It’s raining in Chicago."
    $q$ represents the statement "It’s windy in Boston."
    Translate the following compound statement into words:
    $p \lor q$
    A) It’s raining in Chicago or it’s windy in Boston.  
    B) It’s not the case that it’s raining in Chicago and windy in Boston.  
    C) It’s raining in Chicago and it’s windy in Boston.  
    D) If it’s raining in Chicago, it’s not windy in Boston.

19) $p$ represents the statement "It’s Monday."
    $q$ represents the statement "It’s raining today."
    Translate the following compound statement into words:
    $\neg p \land \neg q$
    A) It’s Monday or it’s raining today.  
    B) It’s not Monday and it’s not raining today.  
    C) It’s not Monday or it’s not raining today.  
    D) It’s not the case that it’s Monday and raining today.
20) \( p \) represents the statement "It's Monday."
\( q \) represents the statement "It's raining today."
Translate the following compound statement into words:
\[ \sim p \lor \sim q \]
A) It's not Monday and it's not raining today.
B) It's Monday and it's raining today.
C) It's not Monday or it's not raining today.
D) It's Monday or it's raining today.

21) \( p \) represents the statement: "Students are happy."
\( q \) represents the statement: "Teachers are happy."
Translate the following compound statement into words:
\[ \sim (p \lor \sim q) \]
A) Students are not happy and teachers are not happy.
B) It is not the case that students are happy or teachers are not happy.
C) Students are not happy or teachers are not happy.
D) It is not the case that students are happy and teachers are not happy.

Let \( p \) represent the statement, "Jim plays football", and let \( q \) represent the statement "Michael plays basketball". Convert the compound statement into symbols.

22) Jim does not play football and Michael does not play basketball.
A) \( \sim p \land \sim q \)
B) \( \sim p \land q \)
C) \( \sim (p \land q) \)
D) \( \sim p \lor \sim q \)

23) Neither Jim plays football nor Michael plays basketball.
A) \( \sim p \lor \sim q \)
B) \( \sim (p \land q) \)
C) \( \sim p \lor \sim q \)
D) \( \sim (p \land q) \)

24) Jim does not play football and Michael plays basketball.
A) \( \sim (p \land q) \)
B) \( p \land q \)
C) \( \sim p \land q \)
D) \( \sim p \lor q \)

25) Jim does not play football or Michael plays basketball.
A) \( p \lor q \)
B) \( \sim p \lor q \)
C) \( \sim (p \lor q) \)
D) \( p \land q \)

26) It is not the case that Jim does not play football and Michael does not play basketball.
A) \( \sim (\sim p \land \sim q) \)
B) \( \sim (\sim p \lor \sim q) \)
C) \( \sim p \land \sim q \)
D) \( \sim (p \lor q) \)

27) Jim does not play football or Michael does not play basketball.
A) \( p \land q \)
B) \( \sim p \lor q \)
C) \( \sim (p \land q) \)
D) \( \sim p \land \sim q \)

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

28) \( p \land q \)
A) False
B) True

29) \( \sim p \lor q \)
A) False
B) True
30) $p \land (q \lor p)$  
A) True  
B) False

31) $p \lor \neg q$  
A) True  
B) False

32) $\neg (p \lor \neg q)$  
A) False  
B) True

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

33) $\neg p \lor (q \land \neg r)$  
A) False  
B) True

34) $(p \land \neg q) \land r$  
A) False  
B) True

35) $\neg[(\neg p \land q) \lor r]$  
A) False  
B) True

36) $\neg(p \land q) \land (r \lor \neg q)$  
A) False  
B) True

Rewrite the statement using the if...then connective. Rearrange the wording or words as necessary.

37) Cats chase mice.  
A) If a cat is chasing it, then it is a mouse.  
B) Cats chase mice.  
C) If it is a cat, then it chases mice.  
D) If cats chase, then they chase mice.

38) All chocolate is good.  
A) If it's chocolate, then it's good.  
B) Chocolate is good.  
C) If it's good, then it's got to be chocolate.  
D) If it isn't chocolate, then it isn't good.

39) All children like stuffed toys.  
A) All children like stuffed toys.  
B) If it is not a stuffed toy, then children like it.  
C) If it is a child, then it likes stuffed toys.  
D) If children like it, then it's a stuffed toy.

40) I'll leave when he arrives.  
A) If I leave, then he will leave.  
B) I'll leave when he arrives.  
C) If I will leave, then he'll arrive.  
D) If he arrives, then I'll leave.

41) No cars come from Iceland.  
A) If it doesn't come from Iceland, then it is not a car.  
B) If it's not a car, then it comes from Iceland.  
C) No cars come from Iceland.  
D) If it is a car, then it doesn't come from Iceland.
Tell whether the conditional statement is true or false.
42) \( (5 = 5) \rightarrow (4 = 3) \)
   A) True  B) False

43) Here \( T \) represents a true statement.
   \( T \rightarrow (5 < 3) \)
   A) True  B) False

44) Here \( F \) represents a false statement.
   \( (9 < 5) \rightarrow F \)
   A) True  B) False

45) Here \( T \) represents a true statement.
   \( (6 \times 2 + 4) \rightarrow T \)
   A) True  B) False

46) Here \( F \) represents a false statement.
   \( (2 = 2) \rightarrow F \)
   A) True  B) False

47) \( (52 + 25) \rightarrow (2 + 3 = 5) \)
   A) True  B) False

Write the compound statement in words.
Let \( r = "The puppy is trained." \)
   \( p = "The puppy behaves well." \)
   \( q = "His owners are happy." \)

48) \( \neg r \rightarrow \neg q \)
   A) The puppy is not trained and his owners are not happy.
   B) It is not the case that if the puppy is trained then his owners are happy.
   C) The puppy is trained or his owners are happy.
   D) If the puppy is not trained then his owners are not happy.

49) \( p \rightarrow r \)
   A) The puppy behaves well or the puppy is trained.
   B) If the puppy behaves well then the puppy is trained.
   C) The puppy does not behave well or the puppy is not trained.
   D) If the puppy is trained then the puppy behaves well.

50) \( \neg(p \rightarrow q) \)
   A) The puppy behaves well or his owners are happy.
   B) The puppy behaves well and his owners are happy.
   C) It is not the case that if the puppy behaves well then his owners are happy.
   D) If the puppy does not behave well then his owners are not happy.