MATH M118 Practice Test Chapters 1 and 2

Determine if each of the following potential statements is a true statement, a false statement or not a statement.

(A) true statement (B) false statement (C) not a statement

1. Indianapolis is in Illinois.

2. $2y + 7 = 11$

3. If you fail the M118 final exam, then you will fail the class.

4. Go away from me.

5. A cat is an animal.

6. $3 + 4 = 12$

Let p denote the statement "Jack committed a crime," and q denote the statement "Jack is 21 years old." For each of the following statements in 7-10, choose the letter that gives the correct symbolic notation.

(A) $p \wedge q$ (B) $p \vee q$ (C) $p \wedge \neg q$ (D) $p \vee \neg q$ (E) $\neg (p \vee q)$

(F) $\neg (p \wedge q)$ (G) $p \rightarrow q$ (H) $p \rightarrow \neg q$ (I) $p \leftrightarrow q$ (J) $p \leftrightarrow \neg q$

7. Jack committed a crime but he is not 21 years old."

8. Jack committed a crime or he is 21 years old.

9. Jack didn't commit a crime and he is not 21 years old.

10. Jack committed a crime if and only if he is not 21 years old.

Given the following truth table, write the letter of the compound statement that could replace each symbol: *, @ , #, ?

(A) $\neg p \wedge q$ (B) $(p \vee q) \wedge \neg q$ (C) $(p \wedge q) \vee \neg p$

(D) $p \vee q$ (E) $p \rightarrow \neg q$ (F) $\neg (p \leftrightarrow q)$ (G) None of these

p	q	*	@	#	?
T	T	T	F	F	F
T	F	T	F	T	T
F	T	T	T	F	T
F	F	F	F	F	F

11. *

12. @

13. #

14. ?

15. Complete the following truth table:

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

16. Complete the following truth table:

p	q	$p \rightarrow q$	$p \leftrightarrow q$	$(p \rightarrow q) \wedge (p \leftrightarrow q)$
T	T			
T	F			
F	T			
F	F			

Given the conditional statement, "If you failed the final exam, then you failed the class," write (in words) each of the following:

17. the contrapositive

18. the inverse

19. the converse

Determine the truth value of each of the following compound statements, if you are given these truth values for the simple statements: p is true, q is false, r is true

20. $p \rightarrow \neg (q \vee r)$

21. $\neg (p \wedge \neg r)$

22. $(p \leftrightarrow q) \rightarrow (p \wedge q)$

23. Are the following two statements logically equivalent?

    $\neg p \vee \neg q$ and $\neg (p \wedge q)$

24. Is the following a valid logical argument?

    If it is warm, Sam will go to the park or go shopping.
    It is warm and Sam goes shopping.
    Therefore, Sam does not go to the park.

Let A = {1, 2, 3, 4, 5} and B = {1, 2, 3}

25. Find n(A x B)

26. Find $n(A \cap B)$

27. Find $n(A \cup B)$

28. How many subsets can be constructed from a set containing 6 elements?

29. At Garfield High, 11 students take Algebra but not French, 21 students take French but not Algebra and 46 students take at least one of these two subjects. How many students take both Algebra and French?

30. Let A = {1, 2, 3}, B = {3, 4, 5}, and C = {4, 5, 6} be subsets of U = {1, 2, 3, 4, 5, 6, 7}. Find $A \cap (B' \cup C)$.

31. A set U is partitioned into three subsets F, G and H. The number of elements in F is three times that of H, and the number in H is twice the number in G. If n(U) = 45, find n(F).

32. Of 60 students who were surveyed, 26 had seen movie A, 32 had seen movie B and 7 had seen both movies. How many had seen neither movie?

33. 100 students were surveyed about their music preferences regarding rock, blues and country. Given the information below, how many students like only one of the three types of music?

72 like rock	22 like rock and blues	12 like all 3
40 like blues	20 like rock and country	
37 like country	27 like country and blues	

34. Let A and B be subsets of U, n(U) = 50, $n(A' \cap B') = 10$ and n(B – A) = n(A – B) = 15. Find $n(A \cap B)$.

Determine if each of the following statements is true or false.

35. $B \cap C \subseteq B \cup C$

36. $U - A = A'$

37. $(G \cup H)' = G' \cap H'$

38. $E - F = E \cap F'$

Given the sets A = {1, 2, 3} and B = {e, u}, for each statement below, which of the following symbols should be placed in the blank to make it a true statement?

(a) $\in$ (b) $\notin$ (c) $\subseteq$ (d) =

39. (e, 2) _____ A x B

40. {u} _____ B

41. 2 _____ A ∪ B

42. {2, 3} _____ A ∪ B

43. u _____ B

For each of the following, draw a Venn diagram with 2 subsets A and B and shade the part of the diagram that represents:

44. $A' \cup B$

45. $A' \cap B'$