

Name: _____

Math 150 Fall 2011 Test 1 September 14, 2011

There are twenty questions total with point values given below. Where indicated, write your answer in the space provided. Good luck!

1. (2 points) _____ Which of the following is not a statement?
(a) December 7, 1941, was a Sunday. (b) $5 + 18 = 13$ and $4 - 3 = 1$
(c) Behave yourself and sit down. (d) Accidents are the main cause of deaths of children under the age of 8.
2. (2 points) _____ The negation of the statement "Every dog has its day." is:
(a) Every dog doesn't have its day. (b) Some dog doesn't have its day.
(c) All dogs have their day. (d) Some dog has its day.
3. (2 points) _____ The negation of the statement "You get a stomach ache if you eat ice cream." is:
(a) You can eat ice cream and not get a stomach ache. (b) You get a stomach ache if you don't eat ice cream.
(c) If you don't eat ice cream, you won't get a stomach ache. (d) You shouldn't eat ice cream.
4. (2 points) _____ The negation of the statement "Pete likes Susie and Susie doesn't like Mark." is:
(a) Pete likes Susie and Susie likes Mark. (b) Pete doesn't like Susie and Susie likes Mark.
(c) Pete likes Susie and Susie doesn't like Mark. (d) Pete doesn't like Susie or Susie likes Mark.
5. (2 points) _____ The negation of $5 + 3 \leq 9$ is:
(a) $5 + 3 \geq 9$ (b) $5 + 3 > 9$
(c) $5 + 3 \neq 9$ (d) $5 + 3 < 9$
- (6-7) (10 points) If p is true, q is true, and r is false, find the truth value for each of the following:
6. _____ $\sim q \rightarrow \sim r$
7. _____ $\sim [(\sim p \wedge \sim q) \vee \sim q]$
8. (5 points) _____ If $p \wedge q$ is true, what must be the truth value of q ?
9. (5 points) _____ True or False: $p \wedge \sim p$ is a tautology.
10. (5 points) _____ True or False: If the antecedent of a conditional statement is false, the conditional statement is true.
- (11-14) (20 points) Let p represent the statement "She owns a bike," let q represent the statement "He is a math geek," and let r represent the statement "I aced this test."
(11-12) Convert each of the following compound statements into symbols.
11. _____ "If she owns a bike and he is a math geek, then I aced this test."
12. _____ "I aced this test and he is a math geek, and it is not the case that if she owns a bike, then he is a math geek."

(13-14) Translate the symbolic compound statement into words. Use De Morgan's Laws when possible.

13. $(\sim q \rightarrow r) \leftrightarrow p$

14. $r \vee \sim (p \wedge q)$

(15-17) (15 points) For the given conditional statement, write the converse, the inverse, and the contrapositive in "if...then" form.

"Class being cancelled implies pigs fly."

15. Converse:

16. Inverse:

17. Contrapositive:

18. (10 points) Construct a truth table for $p \rightarrow (\sim (p \wedge \sim q))$:

19. (10 points) Draw an Euler diagram depicting the following argument. Determine if the argument is valid or invalid.

All penguins are black and white.

“I Love Lucy” is not a penguin.

“I Love Lucy” is not black and white.

20. (10 points) Use a truth table to determine whether the argument is valid or invalid.

If it is Tuesday, then we do not have class.

It is not Tuesday.

We have class.