

Name: Key

Math 150 Fall 2014 Test 1 September 16, 2014

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

1. (4 points) B The negation of  $5 + 3 \leq 9$  is:  
(a)  $5 + 3 \geq 9$     (b)  $5 + 3 > 9$   
(c)  $5 + 3 \neq 9$     (d)  $5 + 3 < 9$
2. (4 points) B 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. (4 points) C 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.
4. (4 points) BD 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. (4 points) A 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.

(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. T  $\sim q \rightarrow \sim r$

7. T  $\sim [(\sim p \wedge \sim q) \vee \sim q]$

8. (5 points) T If  $\sim(p \wedge q)$  is false, what must be the truth value of  $q$ ?

9. (5 points) F If  $q \rightarrow (p \wedge \sim p)$  is true, what must be the truth value of  $q$ ?

10. (5 points) F True or False: Whenever  $p \wedge q$  is false,  $p \iff q$  is false.

(11-13) (15 points) Write the negations of the following statements in words. Use DeMorgan's Laws if possible.

11. Some cars have four doors.

All cars don't have four doors.

12. That was then and this is now.

That wasn't then or this isn't now.

13. If it has fur, then it sheds.

It has fur and it doesn't shed.

(14-17) (20 points) For the given conditional statement, write the conditional, converse, the inverse, and the contrapositive in "if...then" form.

"Class is cancelled only if pigs fly."

14. Conditional:

if class is cancelled, then pigs fly.

15. Converse:

If pigs fly, then class is cancelled.

16. Inverse:

If class isn't cancelled, then pigs don't fly.

17. Contrapositive:

If pigs don't fly, then class isn't cancelled.

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

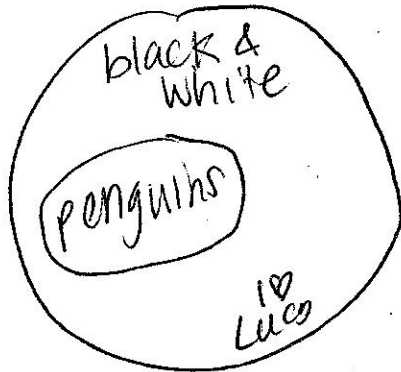
$p$	$q$	$\sim q$	$p \wedge \sim q$	$\sim(p \wedge \sim q)$	$p \rightarrow (\sim(p \wedge \sim q))$
T	T	F	F	T	T
F	T	F	F	T	T
T	F	T	T	F	F
F	F	T	F	T	T

19-20 Draw an Euler diagram depicting the following argument. Determine if the argument is valid or invalid. (10 points)

All penguins are black and white.

19. "I Love Lucy" is not a penguin.

"I Love Lucy" is not black and white.

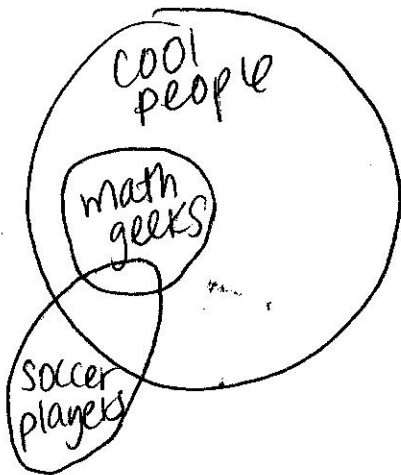


Invalid!

All math geeks are cool.

20. Some math geeks play soccer.

Some soccer players are cool.



Valid!