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2017-2018 Spring Semester MATH 3050 Section 101 (Barsamian) Homework 1, Due Mon Jan 22, 2018

Problem:	1	2	3	4	5	6	7	8	9	Total	Rescaled
Your Score:											
Possible:	10	10	10	10	10	10	10	20	10	100	20

- **Print this cover sheet and write your name on it.**
- **Except for Problem [9] don't write anything else on this sheet. Do your work on separate paper.**
- **You are encouraged to work together, but the words that you write should be your own.**
- **Assemble your pages in order and staple this cover sheet to the front.**
- **Turn in at the beginning of class on Monday, January 22, 2018. Late papers will not be accepted.**

[1] (similar to suggested problems 2.1#25, 36) Use DeMorgan's laws to find the following negations.
(a) Find the negation of statement *P*: *Bob is green and George is red.*
(b) Find the negation of statement *Q*: $5 \le x < 6$.

[2] (similar to suggested problem 2.1#41)
(a) Make a truth table for the statement form $(\sim p \vee q) \vee (p \wedge \sim q)$
(b) Is the statement form in (a) a tautology, a contradiction, or neither? Explain.

[3] (similar to suggested problem 2.2#7) Make a truth table for the statement form $\sim p \wedge q \to r$

[4] (similar to suggested problems 2.2#15 and 2.1#14,16)
(a) Use a truth table to verify that $p \to q \equiv \sim p \vee q$
(b) Explain why $\sim(p \to q) \equiv p \wedge \sim q$

[5] Suppose that p and q are statements such that $p \to q$ is false. Find the truth values of the following:
(a) $\sim p \to q$ (b) $p \vee q$ (c) $q \to p$

[6] (similar to suggested problems 2.2#20, 22, 23) Consider statement *S*: If $x = 3$, then $x^2 = 9$.
(a) In words, write the *contrapositive of S*.
(b) In words, write the *converse of S*.
(c) In words, write the *inverse of S*.
(d) In words, write the *negation of S*.

[7] (a) Give an example of a conditional statement *A* such that *A* is true and *the converse of A* is false.
(b) Give an example of a conditional statement *B* such that *B* is true and the *converse of B* is also true.

[8] (similar to suggested problem 2.2 # 20) Write the negation of each statement:
(a) If the car is red then the house is blue.
(b) If today is February 28, then tomorrow is March 1.
(c) If *n* is divisible by 6, then *n* is divisible by 2 and *n* is divisible by 3.

[9] (sim to sugg prob 2.2 # 20,22,23) Let *S* be the conditional statement: "If Alex is a Shark then Betty is a Jet." Some of the following statements below are the converse, inverse, contrapositive, or negation of *S*. Indicate which by writing the appropriate word in the blanks to the right. If none, then write "none".
(a) If Alex is not a Shark, then Betty is not a Jet. ____________________________________
(b) If Alex is a Shark, then Betty is not a Jet. ____________________________________
(c) If Betty is a Jet, then Alex is a Shark. ____________________________________
(d) If Betty is not a Jet, then Alex is not a Shark. ____________________________________
(e) Alex is a Shark and Betty is not a Jet. ____________________________________
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