CS 173, Fall 17 Examlet 1, Part A

Name:_____

NetID:_____ **Lecture: A B**

Discussion: Thursday Friday 10 11 12 1 2 3 4 5 6

1. (5 points) State the negation of the following claim, moving all negations (e.g. "not") so that they are on individual predicates.

There is a violin v, such that v is not old but the maker of v is not known;

2. (5 points) State the contrapositive of the following claim, moving all negations (e.g. "not") so that they are on individual predicates.

For every tiger k, if k is orange, then k is large and k is not friendly.

3. (5 points) Suppose that F and G are functions whose inputs and outputs are positive real numbers, defined by $F(x) = x$ and $G(x) = x^2$. Compute the value of $G(F(G(x)))$. Simplify your answer and show your work.

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1. (5 points) State the negation of the following claim, moving all negations (e.g. "not") so that they are on individual predicates.

For every computer game g, if g has trendy music or g has an interesting plotline, then g is not cheap.

2. (5 points) State the contrapositive of the following claim, moving all negations (e.g. "not") so that they are on individual predicates.

For every tree t, if t is in Illinois and t is not hardy, then t is indoors.

3. (5 points) List all solutions to the equation $abc = 6$, where a, b, and c are natural numbers.

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1. (5 points) Give a truth table for the following expression and (using your truth table or other means) find a simpler expression equivalent to it.

$(p \to p) \to p \equiv$

p	$p \to p$	$(p \to p) \to p$
T		
F		

2. (5 points) State the negation of the following claim, moving all negations (e.g. "not") so that they are on individual predicates.

For every dragon d, if d is green, then d is not large or d is fat.

3. (5 points) Suppose that G and H are functions whose inputs and outputs are real numbers, defined by $G(x) = x - 5$ and $H(x) = \sqrt{x+1}$. Compute the value of $H(H(G(13)))$, showing your work.

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1. (5 points) State the negation of the following claim, moving all negations (e.g. "not") so that they are on individual predicates.

For every mountain m, if m is tall or m is not in the north, then m has a snow cap.

2. (5 points) Solve $3x + 2m = \frac{w}{y}$ for x, expressing your answer as a single fraction. Simplify your answer and show your work.

3. (5 points) Give a truth table for the following expression and (using your truth table or other means) find a simpler expression equivalent to it.

$(p \to q) \wedge (p \to \neg q) \equiv$

p	q	$p \to q$	$p \to \neg q$	$(p \to q) \wedge (p \to \neg q)$
T	T			
T	F			
F	T			
F	F			

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1. (5 points) State the negation of the following claim, moving all negations (e.g. "not") so that they are on individual predicates.

If the date is before 1800, then every monster m is either smelly or large.

2. (5 points) State the contrapositive of the following claim, moving all negations (e.g. "not") so that they are on individual predicates.

For every egg E, if E floats, then E is not good or the water has been salted.

3. (5 points) Suppose that F and G are functions whose inputs and outputs are real numbers, defined by $F(x) = x^2 - 4x$ and $G(x) = x + 4$. Compute the value of $F(G(z))$, showing your work.

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1. (5 points) State the negation of the following claim, moving all negations (e.g. "not") so that they are on individual predicates.

For every dragon d, if d is not large, then d is green or d not hungry.

2. (5 points) State the contrapositive of the following claim, moving all negations (e.g. "not") so that they are on individual predicates.

For every car c, if c is a Tesla, then c is new or c is not fast.

3. (5 points) Solve $\frac{3}{7x} + a = \frac{b}{7}$ for x, expressing your answer as a single fraction. Simplify your answer and show your work.