CS 173, Fall 2016
Examlet 1, Part A

NETID:

FIRST:	LAST:

Discussion: Thursday 2 3 4 5 Friday 9 10 11 12 1 2

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 dinosaur d, if d is huge, then d is not a juvenile and d is a sauropod.

3. (5 points) Suppose that x is an integer and $x^2 + 3x - 18 < 0$. What are the possible values of x? Show your work.

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1. (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.

2. (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 relish r such that r is orange but r is not spicy.

3. (5 points) Describe all (real) solutions to the equation $(x + y)^2 \leq x^2 + y^2$. Show your work.

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

For every book b, if b is blue or b is not heavy, then b is not a math book.

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

3. (5 points) Recall that $i = \sqrt{-1}$. Compute the value of $(1 + i)(2 - i)(3 - i)$. Show your work.

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1. (5 points) Show that the following two expressions are not logically equivalent, by giving specific values of p, q, and r for which they produce different values.

$(p \to q) \wedge r$

$p \to (q \wedge r)$

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 dog d, if d is a terrier, then d is not large and d is noisy.

3. (5 points) Solve $16p^2 - 81 = 0$ for p. 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 tree t, if t grows in Canada, then t is not tall or t is a conifer.

2. (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.

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.

$p \wedge (p \vee q) =$

p	q	$p \vee q$	$p \wedge (p \vee q)$
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.

For every relish r, if r is orange and r is not spicy, then r is pungent.

2. (5 points) Suppose that F and G are functions whose inputs and outputs are real numbers, defined by $F(x) = x - 6$ and $G(x) = x^2 + 8$.

Compute the value of $\dfrac{F(F(G(2)))}{F(\pi)}$. 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.

$r \to (q \to r) =$

q	r	$q \to r$	$r \to (q \to r)$
T	T		
T	F		
F	T		
F	F		