CS 173, Spring 18 Examlet 1, Part A

Name:_____

NetID:_____ **Lecture: A B**

Discussion: Thursday Friday 9 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.

For every dinosaur k, if k is blue, then k is not vegetarian or k is friendly.

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

3. (5 points) List all solutions to the equation $abc = 2$, where a, b, and c are integers. Notice that a solution where $a = 8$ and $b = 3$ would be different from a solution with $a = 3$ and $b = 8$.

Name:_____

NetID:_____ **Lecture: A B**

Discussion: Thursday Friday 9 10 11 12 1 2 3 4 5 6

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.

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

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			

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 grows in Canada, then t is not tall or t is a conifer.

3. (5 points) Suppose that m and p are positive integers such that $2p^2 + mp < 6$. What are the possible values for m? Briefly explain or show work.

CS 173, Spring 18 Examlet 1, Part A

Name:_____

NetID:_____ **Lecture: A B**

Discussion: Thursday Friday 9 10 11 12 1 2 3 4 5 6

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

$p \to (q \to r)$

$p \wedge (q \wedge r)$

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) Suppose that G and H are functions whose inputs and outputs are real numbers, defined by $G(x) = x + 7$ and $H(x) = \sqrt{x - 1}$. Compute the value of $G(H(H(2)))$, showing your work.

CS 173, Spring 18 Examlet 1, Part A

Name:_____

NetID:_____ **Lecture: A B**

Discussion: Thursday Friday 9 10 11 12 1 2 3 4 5 6

1. (5 points) Are the following two expressions logically equivalent? Briefly justify your answer.

$(p \wedge q) \rightarrow r$ $(p \wedge \neg r) \rightarrow \neg q$

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 jedi j, if j has a light saber and j is not sick, then j can defeat the Dark Side.

3. (5 points) Suppose that G and H are functions whose inputs and outputs are real numbers, defined by $G(x) = x^2$ and $H(x) = 2x - 10$. Compute the value of $G(H(G(3)))$, showing your work.

CS 173, Spring 18 Examlet 1, Part A

Name:_____

NetID:_____ **Lecture: A B**

Discussion: Thursday Friday 9 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 mushroom f such that f is not poisonous or f is blue.

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 alien A, if A has three fingers or A is not tall, then A is friendly.

3. (5 points) Find all integer solutions to $x^2 - 2x - 3 < 0$. Show your work.

Name:_____

NetID:_____ **Lecture: A B**

Discussion: Thursday Friday 9 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.

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

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

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