CS 173, Spring 19 Examlet 1, colored

Name: _____

NetID: _____ **Lecture: A B**

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

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

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

For any student s, if s rides a bicycle, then s wears a helmet or s has no fear of death.

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

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.

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

p	q	$p \wedge q$	$(p \wedge q) \vee q$
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 cat c, if c is not fierce or c wears a collar, then c is a pet.

3. (5 points) Solve $16p^2 - 81 = 0$ for p. Simplify your answer and 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 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 tree t, if t is in Illinois and t is not hardy, then t is indoors.

3. (5 points) Suppose that k is a positive integer, x is a positive real number, and $\frac{1}{k} = x + \frac{1}{6}$. What are the possible values for k? (Hint: k is an INTEGER.) Briefly explain or show work.

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 for which they produce different values.

$p \to (q \to p)$

$(p \to q) \to p$

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) Suppose that k is a positive integer, x is a positive real number, and $\frac{1}{k} + x = \frac{1}{6}$. What are the possible values for k? (Hint: k is an INTEGER.) Briefly explain or show 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 tree t, if t grows in Canada, then t is not tall or t is a conifer.

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 garbage can c, if c was supplied by the city, then c is small or c has wheels.

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

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 negation 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) Solve $\dfrac{2m^2 - m - 6}{m - 2} = 9$ for m. (Assume $m \neq 2$.)

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 soup s such that s is tasty and s does not contain meat.

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

For any bear b, if b is blue and b talks, then b is fuzzy.

3. (5 points) Suppose that G and H are functions whose inputs and outputs are real numbers, defined by $G(x) = x - 2$ and $H(x) = \sqrt{2x + 1}$, where the square root function returns only the positive root. Compute the value of $H(G(G(8)))$, showing your work.

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, 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 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 x is an integer and $x^2 + 3x - 18 < 0$. What are the possible values of x? Show your work.

CS 173, Fall 18 Examlet 1, Part A

Name:_____

NetID:_____ **Lecture: B**

Discussion: Friday 11 12 1 2 3 4

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

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

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.

CS 173, Fall 18 Examlet 1, Part A

Name:_____

NetID:_____ **Lecture: B**

Discussion: Friday 11 12 1 2 3 4

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

3. (5 points) Suppose that F and G are functions whose inputs and outputs are positive real numbers, defined by $F(x) = x^2 + 14x$ and $G(x) = \sqrt{x + 49}$. Compute the value of $G(F(p))$. Simplify your answer and show 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.

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.

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.

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.

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.

Name:_____

NetID:_____ **Lecture: A B**

Discussion: Thursday Friday 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.

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

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.

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.

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			

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.

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.

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.

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.

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.

John has a camera and there is a Meerkat m, such that m lives in New York and John has not photographed m

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 violin v, if v is old or the maker of v is not known, then v is not valuable.

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.

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.

For every Meerkat m, if m is in New York, then m is not in the wild or m is lost.

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

3. (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 small and d is not a juvenile, then d is not a sauropod.

Name:_____

NetID:_____ **Lecture: A B**

Discussion: Thursday Friday 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 for which they produce different values.

$p \to (q \to p)$

$(p \to q) \to p$

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 cat c, if c is not fierce or c wears a collar, then c is a pet.

3. (5 points) Suppose that k is a positive integer, x is a positive real number, and $\frac{1}{k} = x + \frac{1}{6}$. What are the possible values for k? (Hint: k is an INTEGER.) Briefly explain or show work.

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.

If it is raining, then there is a cyclist c such that c is getting wet.

2. (5 points) Describe all (real) solutions to the equation $2p^2 + p - 6 < 0$. 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	$r \to q$	$(r \to q) \to r$
T	T		
T	F		
F	T		
F	F		

Name:_____

NetID:_____ **Lecture: A B**

Discussion: Thursday Friday 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.

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

p	q	$p \wedge q$	$(p \wedge q) \vee q$
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 elephant e, if e likes to dance and e has good taste, then e likes Juluka.

3. (5 points) Solve $\frac{x}{2} - 1 < 3x + 9$ for x. (Assume x is real.) Show your work.

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.

For every violin v, if v is old or the maker of v is not known, then v is not valuable.

2. (5 points) Suppose that f and g are functions whose inputs and outputs are real numbers, defined by $f(x) = x^2 - 1$ and $g(x) = \frac{x}{2}$. Compute the value of $g(f(y + 1)))$, showing your work.

3. (5 points) State the contrapositive of the following claim, moving all negations (e.g. "not") so that they are on individual predicates.

For every garbage can c, if c was supplied by the city, then c is small or c has wheels.