Writing Exercises. Type up your solutions to #1 and #2 using LaTeX. Start by going to the course webpage and downloading the .tex file for this assignment; pop that .tex file into your favorite latex editor (probably Overleaf.com) and type your responses just after the corresponding problem in the .tex file.

1. Make a truth table for the following two statements.

    (a) $\sim Q \implies \sim P$
    (b) $\sim P \vee Q$

P	Q	$\neg Q$	$\neg P$	$\sim Q \implies \sim P$	$\neg P \vee Q$
T	T	F	F	T	T
T	F	T	F	F	F
F	T	F	T	T	T
F	F	T	T	T	T

2. Use the specified variables to represent the five mathematical statements provided below. For each lettered statement written symbolically, translate the sentence into reasonably sensible colloquial English using the statements defined above and our translation for logical connectives.

P : Fritz likes to eat lettuce. Q : Fritz plays in the indoor pool.

R : Fritz likes to eat melon. S : Fritz wears a crown.

T : Fritz has a sister named Fifi.

   (a) $(P \wedge Q) \wedge \neg T$
       Fritz likes to eat lettuce and melon and Fritz does not have a sister named Fifi.
   (b) $T \implies (S \vee R)$
       If Fritz has a sister named Fifi, then Fritz wears a crown or likes to eat melon.
   (c) $(P \vee S) \wedge Q$
       Fritz likes to eat lettuce or wears a crown and Fritz plays in the indoor pool.

Computational Exercises. Complete these problems, #3 and #4. You need not typeset your answers, unless you want to. Staple your answers to your write-up for the Writing Exercises and turn in one homework with your name on the front, at the top.

C : the function f is continuous at a D : the function f is differentiable at a

P : the number b is positive R : the number b is a real number

3. Assign to the symbols C, D, P, and R the statements shown above. Assume that f is a fixed function and a, b are fixed numbers. Write each of the lettered statements below symbolically.

   (a) The function f is continuous at a but not differentiable there.

   (b) If the function f is continuous at a then it is differentiable there, too.

   (c) If the number b is positive then it is a real number, and if the number b is a real number then it is a positive number.

#4 is stated on the reverse.

4. For each inequality given, do the following steps in order:

- graph the inequality on a number line,
- graph the negation of the inequality on the number line,
- write symbols for the negations without using a slash (/) or a "not" ($\neg$, $\sim$) symbol in your answer, and
- double check that the graph and symbols for the negation match.

(a) $x > -5$

(b) $x \leq 8$

(c) $x = 7$

(d) $-7 \leq x < -3$

(e) $|x| > 3$