This is an example of an exam that was given in a previous semester. This exam is being provided as a study aid.

- You should NOT expect the actual exam to be the same as this exam.
- Some topics may be emphasized more or less. Some topics that are not covered on this exam might be covered on yours.
- Knowing just how to do the questions on this exam is not a good study technique.
- It is recommended that you complete this as a practice exam under as close to exam conditions as possible - give yourself 50 minutes in a quiet room after studying. Do not look at notes while taking the exam. Once you are done, go back and review topics you had trouble with. Then, use the worksheets for more practice or to identify other topics to review.

University of Connecticut
Department of Mathematics

Math 1071 Exam 1 Version A Sample Exam

Name: _____

Signature: _____

Instructor Name: _____ Class Time: _____

Read This First!

- Please read each question carefully. The point value of each question is indicated in the right margin after its statement. The exam is out of a total of 60 points.

- In all questions, you will **NOT** receive full credit by just giving your answer. You must provide clear work using techniques learned in this class.

- Calculators are allowed **below the level of TI-89**. In particular, **TI-Nspire is not allowed**. No books, formula sheets, or other references are permitted.

- No personal scrap paper is allowed. If you need additional space to write, it will be provided by your instructor. All scrap paper must be turned in with the exam.

Grading - For Administrative Use Only

Question:	1	2	3	4	5	6	7	8	Total
Points:	4	6	8	6	9	9	9	9	60
Score:									

Short Answer

1. Rationalize the numerator of the following expression and simplify: [4]

$$\frac{\sqrt{x+1}-2}{x-3}$$

2. Evaluate the limits below using algebraic techniques. Show your steps. [6]

   (a) $\lim_{x\to 1} \dfrac{x^2+3x+5}{x-4}$

   (b) $\lim_{x\to 2} \dfrac{x^2-3x+2}{x-2}$

3. John works for the local used car dealership. His weekly salary is \$250 plus a commission based on the number of cars that he sells. His commission is \$50 per car for the first 5 cars sold each week. For any car over 5 sold each week, John earns a commission of \$100 per car.

   (a) How much money will he earn for the week if he sells 3 cars? [2]

   (b) How much money will he earn for the week if he sells 7 cars? [2]

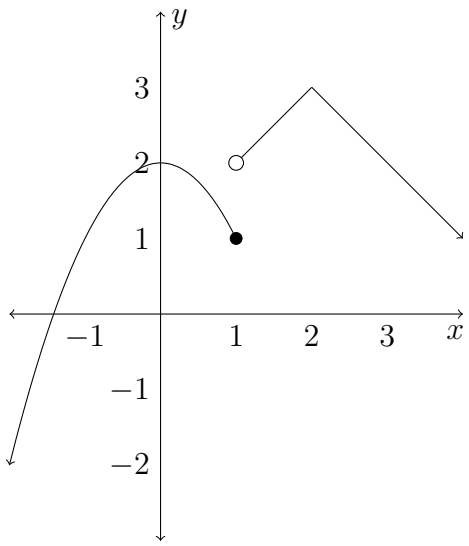
   (c) Write out the piecewise function that can be used to calculate John's weekly salary, S, when he sells t cars each week. [4]

4. Selena has $5000 that she wants to invest into an account for 10 years.

   (a) How much money does Selena have after 10 years if the account earns 4.5% interest compounded continuously? [3]

   (b) What interest rate does she need for her money to triple after 10 years if the account is compounded continuously? [3]

5. Use the graph below to answer the following questions. If the limit does not exist, write DNE. (1 point each, (f) and (g) are two points each) [9]



(a) $\lim_{x\to 1^-} f(x) =$

(b) $\lim_{x\to 1^+} f(x) =$

(c) $f(1) =$

(d) $\lim_{x\to 1} f(x) =$

(e) $\lim_{x\to 2} f(x) =$

(f) At which x value(s) is this function not continuous?

(g) At which x value(s) is the function not differentiable?

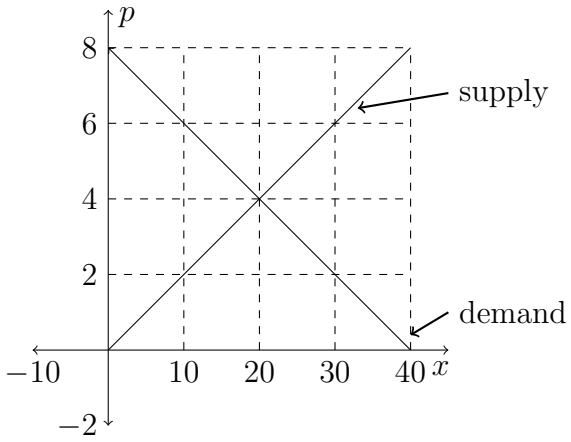
6. Let $f(x) = x^2 - 3x - 4$ and $g(x) = \sqrt{x-3}$. [9]

(a) Find $(g \circ f)(x)$.

(b) Factor $f(x)$.

(c) Find the domain of $\dfrac{g(x)}{f(x)}$. Write your answer in interval notation.

7. The graph of the supply and demand equations for product are given below where p is price per pound in dollars and x is in pounds. [9]



(a) What is the equilibrium quantity and price? Give units for each.

(b) If the price per pound is \$6, what is the revenue?

(c) Find the equation of the supply function $p(x)$.

8. Let $f(x) = x^2 + 3$.

   (a) Find the average rate of change on the interval $[1, 4]$. [3]

   (b) Find the instantaneous rate of change at $x = 2$. You must use the limit definition and show all steps. [6]