Practice Midterm 1 **Name:** _____
Date: 17/09/2021
Math 1A: Fall 2021

1. This practice is meant for 50 minutes - your exam will be 80 minutes.
2. I do not know what your actual exam looks like. The questions here are based on what I can gather from looking at previous midterms offered by Prof. Haiman + other professors.
3. The actual exam is closed book, no calculators. So for the best practice I would recommend doing that too for this.
4. You are allowed a single sided cheat sheet I believe for the exam - feel free to use it for this if you'd like.
5. Show your work. Don't just write down the answer. Answers with little justification will usually not get you many points.
6. If you want it graded, REMEMBER TO WRITE YOUR NAME on the top.

Score breakdown:

- 1a: /5
- 1b: /5
- 1c: /5
- 2: /5
- 3a: /5
- 3b: /5
- 4a: /5
- 4b: /5
- Total: /40

Problem 1 (15 Points)

1. (5 pts) Find the domain of the function $f(x) = \ln\left(\frac{x+2}{x-1}\right)$.
2. (5 pts) Does this function have an inverse? Why or why not?
3. (5 pts) Find all vertical and horizontal asymptotes of the graph of f.

Problem 2 (5 Points)

Show the function $2^x = \frac{x^2}{4}$ has a solution in the interval $[-2, -1]$.

Problem 3 (10 Points)

Find the limits (possibly infinite) of the following if they exist. If they don't then explain why not.

1. (5 pts) $\lim_{x \to \frac{\pi}{2}} \frac{100}{\tan(x)}$
2. (5 pts) $\lim_{x \to 0} \arcsin(e^x - \frac{1}{2})$

Problem 4 (10 Points)

Consider the function $f(x) = 1 + \sqrt{-x}$ defined on the interval $(-\infty, 0)$.

1. (5 pts) Describe the steps to transform the graph of $f(x)$ to that of $g(x) = \sqrt{2 - 2x}$.
2. (5 pts) Let $h(x) = \begin{cases} \sqrt{2-2x}, \text{ if } x < 1 \\ c + x, \text{ if } x \geq 1 \end{cases}$.

   Find c such that the function h is continuous everywhere.