

Math 1271 - Lectures 010 and 030

Name (Print): _____

Fall 2017

Quiz 1

09/07/17

Time Limit: 25 Minutes

Section _____

You may *not* use your books, notes, graphing calculator, phones or any other internet devices on this exam.

You are **required** to show your work on each problem on this quiz. If you are unable to demonstrate your answer in full rigor, supporting evidence may possibly be redeemed for partial credit.

1. Find the real numbers within the interval I at which f is *not* continuous. State whether f is continuous from the right, the left, or neither. Justify with words and/or a graph of $y = f(x)$.

(a) (1 point) $f(x) = \frac{1}{x^2 + 5x - 14}$ $I = (-\infty, \infty)$.

(b) (1 point) $f(x) = \frac{\cos \frac{x}{2}}{\sin 2x}$ $I = [-\pi, \pi]$

(c) (1 point) $f(x) = \begin{cases} 3^x & x \leq 2 \\ -3x + 15 & 2 < x \leq 4 \\ \sqrt{x} & x > 4 \end{cases}$ $I = (-3, 8)$

| Problem | Points | Score |
|---------|--------|-------|
| 1 | 3 | |
| 2 | 4 | |
| 3 | 3 | |
| Total: | 10 | |

2. (4 points) Sketch a graph of a function $f(x)$ satisfying the following properties:
 $\lim_{x \rightarrow -\infty} f(x) = -1$, $\lim_{x \rightarrow -1^+} f(x) = 3$, $\lim_{x \rightarrow 0} = \infty$, $\lim_{x \rightarrow 2} f(x) = 4$, $f(2) = 3$, $\lim_{x \rightarrow \infty} f(x) = 1$, f has only two points of discontinuity in the real numbers.

3. Evaluate the following limits. State explicitly which limit laws you are employing:

(a) (1 point) $\lim_{x \rightarrow \infty} \frac{\cos^2(x)}{x^2 - 3}$

(b) (1 point) $\lim_{x \rightarrow \infty} \frac{3x^2 - 2x + 1}{2x^2 + 1}$

(c) (1 point) $\lim_{x \rightarrow -\infty} \frac{|3x^3 - 1|}{x^3 + 2x^2}$