Math 201 Quiz 5B

September 23, 2019

Name: _____

Instructions: No calculators. Use your own scrap. Write your fully simplified answers in the space provided.

1. Name the six kinds of *elementary continuous functions*:

   _____ _____ _____

   _____ _____ _____

2. Using an equation, define what it means for a function $f(x)$ to be *continuous* at $x = a$:

   _____

3. What does it mean to say $f(x)$ is *continuous*?

   _____

4. State where the following are continuous. Use interval notation.

   (a) $f(x) = \ln(4 - x^2)$ _____ (b) $g(x) = \frac{1-2x}{\sqrt{3+x}-\sqrt{5-x}}$ _____

5. Find the value(s) of a and b that make the function $f(x) = \begin{cases} \frac{x^2-4}{x-2} & if \quad x < 2 \\ ax^2 - bx + 5 & if \quad 2 \le x < 3 \\ \frac{5}{3}x + 8a - 4b & if \quad x \ge 3 \end{cases}$ continuous.

   $a =$ _____ $b =$ _____

   If there are no such a and b, state "N/A" for each of the above two slots.

Bonus:

1. Consider the function $f(x) = x - \cos x$

(a) Compute $f(0) =$ _____ and $f(2) =$ _____

(b) Does the equation $f(x) = 0$ have at least one solution? (Yes/no) _____

(c) How do you know? _____