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Math 201 Quiz 5B

September 23, 2019

Name: ANSWERS

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*: (may list in any order).

Polynomials, Radical Functions, Exponential Functions, Rational Functions, Trig Functions, Logarithmic Functions

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

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

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

f is continuous at all points in its domain.

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

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

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

$a =$ $-1/6$ $b =$ $1/6$

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 $f(0) =$ -1 and $f(2) =$ $2 - \cos 2$

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

(c) How do you know? Apply the Intermediate Value Theorem to f.