Math 21A
Kouba
Worksheet 1

1.) Use limits and algebra to determine the value of constants A and B so that each of the following functions is continuous for all values of x.

a.) $f(x) = \begin{cases} \dfrac{x^2 - 7x + 6}{x - 6}, & \text{if } x \neq 6 \\ A, & \text{if } x = 6. \end{cases}$

b.) $f(x) = \begin{cases} A^2 x - A, & \text{if } x \geq 1 \\ 2, & \text{if } x < 1. \end{cases}$

c.) $f(x) = \begin{cases} \dfrac{A + x}{A + 1}, & \text{if } x < 0 \\ Ax^3 + 3, & \text{if } x \geq 0. \end{cases}$

d.) $f(x) = \begin{cases} 3, & \text{if } x \leq 1 \\ Ax^2 + B, & \text{if } 1 < x \leq 2 \\ 5, & \text{if } x > 2. \end{cases}$

e.) $f(x) = \begin{cases} Ax - B, & \text{if } x \leq -1 \\ 2x + 3A + B, & \text{if } -1 < x \leq 1 \\ 4, & \text{if } x > 1. \end{cases}$

2.) For what x-values are the following functions continuous ? Briefly explain why using shortcuts and rules from class. Sketch the graph of each using a graphing calculator.

a.) $g(x) = \dfrac{x + 1}{x^2 - 4}$

b.) $h(x) = \dfrac{100}{4 - \sqrt{x^2 - 9}}$

c.) $h(x) = \sin^3(\ln(3x - 5))$

d.) $g(x) = \begin{cases} \dfrac{x^2 - 3x - 4}{x - 4}, & \text{if } x \neq 4 \\ 5, & \text{if } x = 4. \end{cases}$

e.) $f(x) = \begin{cases} \dfrac{x^3 + 1}{x^2 - 1}, & \text{if } x \neq 1, -1 \\ -3/2, & \text{if } x = -1 \\ 3, & \text{if } x = 1 . \end{cases}$

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