

## MATH 111-007 QUIZ 2

SEPTEMBER 20TH, 2021

Simplify your expressions in the middle of a process (not just at the end of it).

**Problem 1.** Evaluate the following limits, allowing  $+\infty$  and  $-\infty$  as possible values of a limit. Explain why if the limit does not exist.

(1)  $\lim_{x \rightarrow -1} \frac{4x+4}{x^2-2x-3}$ .

(2)  $\lim_{x \rightarrow 0} \frac{\tan(2x)}{\sin(3x)}$ .

**Problem 2.** Find the value(s) of  $a$  such that the following piecewise function is continuous,

$$f(x) = \begin{cases} 4x, & x < 2, \\ a^2x^2 - 4a, & x \geq 2. \end{cases}$$

**Problem.** (Bonus) Based on problem 2 with the value(s) of  $a$  you found, is the function differentiable at  $x = 2$ ? Explain.