

MA161 SEMESTER 1, CALCULUS: PROBLEM SHEET 7

1. Consider the following piecewise defined function

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

Sketch the graph of f . Is f continuous at $x = -2$? Justify your answer.

2. Consider the following piecewise defined function

$$f(x) = \begin{cases} e^{x+1}, & x < -1, \\ 1 + 2x + 2x^2, & x \geq -1. \end{cases}$$

Is f continuous at $x = -1$? Justify your answer.

3. For which values of a is the following function f continuous at $x = 2$?

$$f(x) = \begin{cases} 3x^4 - 5x^3 + x + 3, & \text{if } x < 2, \\ ax^2 + 3x - 4, & \text{if } x \geq 2. \end{cases}$$

4. For which values of a is the following function f continuous on all of \mathbb{R} ?

$$f(x) = \begin{cases} ax + 8, & \text{if } x \leq 2, \\ ax^2 - 8, & \text{if } x > 2. \end{cases}$$