

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

SECTION 2.2

Math 2000 Worksheet

WINTER 2020

For practice only. Not to be submitted.

1. Evaluate each of the following limits, or show that it does not exist.

(a) $\lim_{(x,y) \rightarrow (3,-1)} x^2y^3 + 5xy - 4y + 9$

(b) $\lim_{(x,y) \rightarrow (2,5)} \frac{xy - 8x - 2y + 4}{y^2 - y - 2}$

(c) $\lim_{(x,y) \rightarrow (2,5)} \frac{xy - 4x - 2y + 8}{x^2 - x - 2}$

(d) $\lim_{(x,y) \rightarrow (0,0)} \frac{4x^2 + \sin^2(y)}{x^2 + y^2}$

(e) $\lim_{(x,y) \rightarrow (0,0)} \frac{12x^4y}{x^6 + 3y^3}$

2. Consider the function

$$f(x, y) = \begin{cases} \frac{4x^2 + 12xy + 9y^2}{4x^2 - 9y^2} & \text{for } (x, y) \neq (3, -2) \\ 0, & \text{for } (x, y) = (3, -2) \end{cases}$$

and determine whether $f(x, y)$ is continuous at $(x, y) = (3, -2)$.