

MEMORIAL UNIVERSITY OF NEWFOUNDLAND
DEPARTMENT OF MATHEMATICS AND STATISTICS

ASSIGNMENT 1

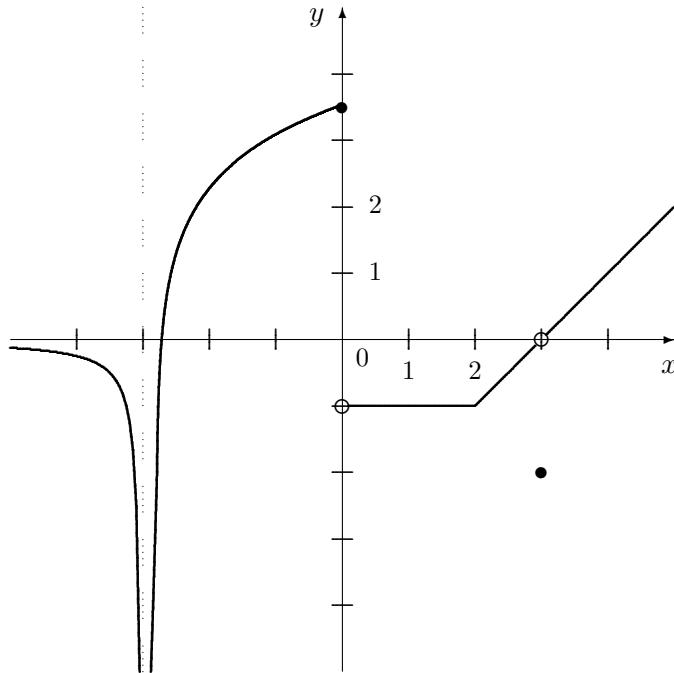
MATHEMATICS 1000

FALL 2024

Due: Monday, September 16th, 2024 at 11:59pm. See the Gradescope Handout for submission information.

Note: You should complete Worksheet 1.2 before you work on this assignment. You should also complete the “Getting Started” WeBWorK problem set if you haven’t already done so.

1. Use the graph of $y = f(x)$ below to determine each of the following (no workings are necessary). If the value of the function is undefined or the limit does not exist, indicate this (but label these limits as ∞ or $-\infty$ where appropriate).



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|-------------|--------------------------------------|--------------------------------------|------------------------------------|
| (a) $f(0)$ | (b) $\lim_{x \rightarrow 0^-} f(x)$ | (c) $\lim_{x \rightarrow 0^+} f(x)$ | (d) $\lim_{x \rightarrow 0} f(x)$ |
| (e) $f(2)$ | (f) $\lim_{x \rightarrow 2^-} f(x)$ | (g) $\lim_{x \rightarrow 2^+} f(x)$ | (h) $\lim_{x \rightarrow 2} f(x)$ |
| (i) $f(3)$ | (j) $\lim_{x \rightarrow 3^-} f(x)$ | (k) $\lim_{x \rightarrow 3^+} f(x)$ | (l) $\lim_{x \rightarrow 3} f(x)$ |
| (m) $f(-3)$ | (n) $\lim_{x \rightarrow -3^-} f(x)$ | (o) $\lim_{x \rightarrow -3^+} f(x)$ | (p) $\lim_{x \rightarrow -3} f(x)$ |

2. Consider the function

$$f(x) = \frac{\sqrt{x+5} - 2}{x^2 - 1}.$$

With the aid of a calculator, investigate each of the following limits by constructing a table of values to find the lefthand and righthand limits. Use the one-sided limits to determine the (two-sided) limit, if it exists. Assign ∞ or $-\infty$ where appropriate.

(a) $\lim_{x \rightarrow -1} f(x)$

(b) $\lim_{x \rightarrow 1} f(x)$