

## Suggested Homework for Lecture 2

### Math 116

(1) Evaluate each of the following limits:

$$(1a) \lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1}$$

$$(1b) \lim_{x \rightarrow 1} \frac{x^3 - 1}{x - 1}$$

$$(1c) \lim_{x \rightarrow 2} \frac{x^3 - x^2 - x - 2}{x - 2}$$

$$(1d) \lim_{x \rightarrow -1} \frac{x^4 + 3x^3 + 5x^2 + 7x + 4}{x + 1}$$

$$(1e) \lim_{x \rightarrow 0} \frac{x^2 + 1}{x + 1}$$

(2) Evaluate the indicated limits (when possible):

$$(2a) \text{ If } f(x) = \begin{cases} x^3 - 1 & \text{if } x \geq 1 \\ -x & \text{if } x < 1 \end{cases}, \text{ evaluate } \lim_{x \rightarrow 1^+} f(x), \lim_{x \rightarrow 1^-} f(x), \text{ and } \lim_{x \rightarrow 1} f(x).$$

$$(2b) \text{ If } f(x) = \begin{cases} e^x & \text{if } x \leq 0 \\ x^5 + 1 & \text{if } x > 0 \end{cases}, \text{ evaluate } \lim_{x \rightarrow 0^+} f(x), \lim_{x \rightarrow 0^-} f(x), \text{ and } \lim_{x \rightarrow 0} f(x).$$

$$(2c) \text{ If } f(x) = \begin{cases} \ln(x) & \text{if } 0 < x < e \\ e^x & \text{if } x > e \end{cases}, \text{ evaluate } \lim_{x \rightarrow e^+} f(x), \lim_{x \rightarrow e^-} f(x), \text{ and } \lim_{x \rightarrow e} f(x).$$

$$(2d) \text{ If } f(x) = \begin{cases} x^2 - 1 & \text{if } x < -1 \\ 2 & \text{if } x = -1 \\ x + 1 & \text{if } x > -1 \end{cases}, \text{ evaluate } \lim_{x \rightarrow -1^+} f(x), \lim_{x \rightarrow -1^-} f(x), \text{ and } \lim_{x \rightarrow -1} f(x).$$

$$(2e) \text{ If } f(x) = \begin{cases} x^4 & \text{if } x < 2 \\ 5 & \text{if } x = 2 \\ 4x^2 + 1 & \text{if } x > 2 \end{cases}, \text{ evaluate } \lim_{x \rightarrow 2^+} f(x), \lim_{x \rightarrow 2^-} f(x), \text{ and } \lim_{x \rightarrow 2} f(x).$$

# Answers to Suggested Homework for Lecture 2

Math 116

(1a) 2

(1b) 3

(1c) 7

(1d) 2

(1e) 1

(2a) 0, -1, does not exist

(2b) 1, 1, 1

(2c)  $e^e$ , 1, does not exist

(2d) 0, 0, 0

(2e) 17, 16, does not exist