

HW 3: Section 1.3

Due: Thursday, September 11th in SQRC by 9pm

Learning Goals:

- Evaluate limits of polynomials, rational functions, trig functions, exponential functions, logarithmic functions, and piece-wise functions.
- Evaluate limits of the product and quotient of functions.

A reminder about collaboration: Collaboration is an important part of learning mathematics and I strongly encourage you collaborate with your classmates on homework and studying for exams. With that said, there is a difference between working with someone else and copying down what they say or write without understanding it. I encourage you to write up final solutions on your own after you understand a problem, which might mean stepping away from your study group for 5 or 10 minutes.

Questions:

1. Problem 1.3.4. Evaluate the limit if it exists: $\lim_{x \rightarrow 2} \frac{x-5}{x^2+4}$.
2. Problem 1.3.6. Evaluate the limit if it exists: $\lim_{x \rightarrow 1} \frac{x^2+x-2}{x^2-3x+2}$.
3. Problem 1.3.16. Evaluate the limit if it exists: $\lim_{x \rightarrow 4} \frac{x^3-64}{x-4}$.
4. Problem 1.3.22. Evaluate the limit if it exists: $\lim_{x \rightarrow -1} f(x)$ where

$$f(x) = \begin{cases} x^2 + 1 & \text{if } x < -1 \\ 3x + 1 & \text{if } x \geq -1 \end{cases}.$$

5. Problem 1.3.26. Evaluate the limit if it exists: $\lim_{h \rightarrow 0} \frac{(1+h)^3 - 1}{h}$.
6. Problem 1.3.46. Use $\lim_{x \rightarrow a} f(x) = 2$, $\lim_{x \rightarrow a} g(x) = -3$ and $\lim_{x \rightarrow a} h(x) = 0$ to determine the limit if possible:

$$\lim_{x \rightarrow a} \frac{2f(x)h(x)}{f(x) + h(x)}$$