

Homework 2

Math 147, Fall 2023

This homework is due on Friday, September 1 (at the start of recitation). *Turn in (via Gradescope) your answers to questions 1–7.*

0. (*This problem is not to be turned in.*) Read Sections 1.2–1.3.
 - (a) Is every function whose graph is a line with slope 6, one-to-one? Is every logarithmic function one-to-one?
 - (b) Does $f(x) = |x|$ have an inverse function? Explain.
 - (c) Section 1.2 #7, 11, 27, 39, 63, 65, 71, 73, 75, 81, 83
 - (d) Section 1.3 #3, 59, 61, 63, 69, 75, 81, 83, 85, 86
1. If $f(x)$ and $g(x)$ are both one-to-one functions, is it true that $h(x) := f(x) + g(x)$ is one-to-one? Justify your answer.
2. Which, if any, of the following functions is one-to-one: $\sin(x)$, $\cos(x)$, $\tan(x)$, $\sec(x)$, $\csc(x)$, $\cot(x)$? Explain your answer.
3. Does every function have an inverse function? Explain.
4.
 - (a) Give an example of a function whose range is $(-\infty, 0]$.
 - (b) Give an example of a function whose range is $[-2, 2]$.
5. What is a (radioactive) decay rate? What is a half-life? How are these two concepts related (mathematically)?
6. Section 1.2 #68, 76, 84
7. Section 1.3 #4, 60, 64, 70, 72, 82