

Homework 3

Math 147, Fall 2023

This homework is due on Friday, Sept. 8 (at the start of recitation). *Turn in (via Gradescope) your answers to questions 1–5.*

0. Read Sections 1.4 (including “Graphing and basic transformations of functions” in 1.4.1) and 3.1
1. Complete the following sentences, and show any work you do.
 - (a) Assume that a and c are positive real numbers. The _____ plot of the exponential function $y = c \cdot a^x$ is a straight line with slope _____ and y -intercept _____.
 - (b) Assume that r is a real number and b is a positive real number. The _____ plot of the power function $y = b \cdot x^r$ is a straight line with slope _____ and y -intercept _____.
2. Use graph transformations to graph $y = 1 - |x|$.
3. Draw an example of a graph of a function $f(x)$ with $f(-1) = 1$ and $\lim_{x \rightarrow -1} f(x) = 8$.
4. Section 1.4 # 10, 26, 32, 44, 52, 58, 64, 84, 94, 98
5. Section 3.1 # 10, 30, 34, 42, 50, 54
6. (These problems are *not* to be turned in!)
 - (a) Section 1.4 #2, 17, 20, 23, 27, 33, 37, 43, 47, 51, 55, 59, 65, 93, 97
 - (b) Section 3.1 #3, 15, 21, 25, 29, 37, 47, 49
7. (These problems are *not* to be turned in!) For each function below, determine the value of a for which $f(x)$ has a limit at $x = 0$.

(a)

$$f(x) = \begin{cases} 0 & \text{if } x \leq 0 \\ x + a & \text{if } x > 0 \end{cases}$$

(b)

$$f(x) = \begin{cases} x + a & \text{if } x < 0 \\ 1 & \text{if } x \geq 0 \end{cases}$$

(c)

$$f(x) = \begin{cases} 2 & \text{if } x \leq 0 \\ (x - 1)^2 + a & \text{if } x > 0 \end{cases}$$

8. (Optional)

- (a) Determine your learning style(s) through the following quiz: <https://vark-learn.com/the-vark-questionnaire/>
- (b) Find study strategies for your learning style(s) here: <https://vark-learn.com/strategies/>