1. Find the domain and x-intercept of the following functions.
   (a) \( w(x) = 3 \log_{\frac{1}{3}}(3x) \)
   (b) \( f(x) = -\ln(x - 2) + 1 \)
   (c) \( g(x) = 3 + \log_2(-x) \)
   (d) \( h(x) = \log_5(2x - 1) - 2 \)

2. Find the long run/end behavior of the functions from problem 1. Explain what the limits tell you about the asymptote(s) of the graph.

3. Sketch a graph of the functions from problem 1, using your work from above.

4. Explain why it does not make sense to ask for the value of \( \lim_{x \to -\infty} \ln x \).

5. (a) If \( \lim_{x \to 2^+} f(x) = 8 \), but \( \lim_{x \to 2} f(x) \) does not exist, what do you know about \( \lim_{x \to 2^-} f(x) \)? Explain.

   (b) If \( \lim_{x \to -\infty} f(x) = \infty \), \( \lim_{x \to \infty} f(x) = 3 \), and \( \lim_{x \to 1^+} f(x) = \infty \), what do you know about any horizontal and vertical asymptotes of the graph \( y = f(x) \)? Explain.

6. Given the approximate values \( \log_3 2 = 0.6 \) and \( \log_3 7 = 1.8 \), find:
   (a) \( \log_3 14 \)
   (b) \( \log_3 8 \)
   (c) \( \log_3 \left(\frac{3}{7}\right) \)

7. Find the exact value of the expression \( \ln(e^5 \cdot 3^{2\log_3 e}) + \frac{1}{2}e^{2\ln 16} \)

8. Find the domain of the function \( g(x) = \frac{7e^x}{2 - \log_{12}(x^2 - 25)} \)