1. For each of the three graphs drawn below, determine whether or not the graph depicts a function. If it does, answer parts (a) to (c).

(a) Determine the domain and range of the function.
(b) Estimate the value of the function at \( x = 2 \).
(c) Determine whether or not the function is a one-to-one function.

2. For each of the following functions, determine its domain and range and sketch its graph.

(a) \( a(x) = 4 \)
(b) \( b(x) = -x^2 - 4x - 3 \)
(c) \( c(x) = \sqrt{3 - x} \)
(d) \( d(x) = \frac{2}{x + 1} \)
(e) \( e(x) = |2x + 1| - 3 \)
(f) \( f(x) = \ln(x + 1) \)
(g) \( g(x) = 3 \sin x - 2 \)
(h) \( h(x) = \begin{cases} 2 - x & \text{if } x \geq 1 \\ 3 & \text{if } x < 1 \end{cases} \)

3. For each of the following pairs of functions, determine the functions \( f \circ g \) and \( g \circ f \) and state their domains and ranges.

(a) \( f(x) = x^2 - 2 \) and \( g(x) = \sqrt{x} \)
(b) \( f(x) = \frac{2}{x} \) and \( g(x) = e^x \)
(c) \( f(x) = \cos x \) and \( g(x) = \frac{1}{x + 1} \)

4. For each of the following functions, determine whether or not the function is one-to-one. For each function that is one-to-one, determine its inverse function, and state their domains and ranges.

(a) \( f(x) = 2 - 3x \) with domain \( \mathbb{R} \)
(b) \( g(x) = \cos x \) with domain \( \left[ -\frac{\pi}{2}, \frac{\pi}{2} \right] \)
(c) \( h(x) = x^2 - 2 \) with domain \( \mathbb{R} \)
(d) \( k(x) = e^{x-1} \) with domain \( \mathbb{R} \)

5. Determine the following limits or explain why they do not exist.

(a) \( \lim_{x \to 2} \frac{10x + 12}{x - 2} \)
(b) \( \lim_{x \to \infty} \frac{2}{1 - x} \)
(c) \( \lim_{x \to -1} \frac{2x^2 - 3x - 5}{x + 1} \)
(d) \( \lim_{x \to 0} \frac{\sqrt{x + 1} - 1}{x} \)

(e) \( \lim_{x \to 1} f(x) \) for \( f(x) = \begin{cases} \sqrt{x - 1} & \text{if } x \geq 1 \\ -x + 1 & \text{if } x < 1 \end{cases} \)

(f) \( \lim_{x \to 10} f(x) \) for \( f(x) = \begin{cases} \log_{10} x & \text{if } x > 10 \\ x - 10 & \text{if } x \leq 10 \end{cases} \)