Exercise 1: Computing Asymptotes

Compute all the asymptotes of these functions.

(a) \( f(x) = \frac{x^2 + 1}{x + 1} \)

(b) \( g(x) = \frac{x^2 + x}{x^2 - 4} \)

Exercise 2: Graph Sketching 1

Sketch the following functions:

(a) \( f(x) = \ln(x^2 + 1) \)

(b) \( g(x) = e^{-x^2} \)

(c) \( h(x) = \frac{x + 4}{x^2 - 2x - 3} \)

Exercise 3: Graph Sketching 2

Sketch a function with the following characteristics:

(a) \( f'(x) \) is positive for \( x < 0 \) and negative for \( x > 0 \).

(b) \( f(x) \) has a maximum in \( x = 0 \).

(c) \( f(x) \) has only two inflection points, at \( x = \pm \frac{\sqrt{3}}{3} \)

(d) \( \lim_{x \to \pm \infty} f(x) = 0 \).