1. For each of the following functions

   1. Find all vertical and horizontal asymptotes.

   2. Find where f is above and below the x-axis and where it crosses the x-axis.

   3. Find where f is increasing, decreasing, and all relative extrema.

   4. Find where f is concave up, concave down, and all points of inflection.

   5. Sketch a graph of $y = f(x)$ being sure to label all asymptotes, zeros, relative extrema, and points of inflection.

   (a) $f(x) = x^2 - 1$

   (b) $f(x) = x^5 - x^4$

   (c) $f(x) = \dfrac{1}{x^2 + 1}$

   (d) $f(x) = \dfrac{x + 1}{x - 1}$

   (e) $f(x) = \frac{1}{3}x^3 + x^2 + x - 17$

   (f) $f(x) = x^{\frac{1}{3}}$

   (g) $f(x) = x^{\frac{2}{3}}$

   (h) $f(x) = \dfrac{x^2}{x^2 - 1}$

   (i) $f(x) = x^4 - x^2$

   (j) $f(x) = \sin x$