SECTION 4.5 CURVE SKETCHING (DAY 1)–WRAPUP

Yesterday's Practice Example: $k(x) = \dfrac{x^3 - 1}{x^3 + 1}$

Summary of info:

- Domain: $(-\infty, -1) \cup (-1, \infty)$.
- x-intercept: $x = 1$
- y-intercept: $y = -1$
- Vertical Asymptotes: the line $x = -1$; as $x \to -1^-$, $k(x) \to \infty$; as $x \to -1^+$, $k(x) \to -\infty$
- No maxima, minima, but the slope of the tangent line to the curve at x = 0 is 0.
- Always increasing
- concave up on $(-\infty, -1)$ and $(0, \sqrt[3]{\frac{1}{2}})$
- concave down on $(-1, 0)$ and $(\sqrt[3]{\frac{1}{2}}, \infty)$
- Inflection points: $x = 0$, and $x = \sqrt[3]{\frac{1}{2}}$ (and concavity change at $x = -1$).
- Horizontal behavior:

  We need to compute the following (you technically may use L'H, but you do not have to...):

  $\displaystyle\lim_{x\to\infty} \frac{x^3 - 1}{x^3 + 1} =$ $\qquad\qquad$ $\displaystyle\lim_{x\to-\infty} \frac{x^3 - 1}{x^3 + 1} =$

  We conclude that ____.

Now sketch. Label all asymptotes with their kind and their equation. Label all maxima, minima (there are none in this case) and inflection points. Label all areas of concave up (CU) and concave down (CD).