Math 241

Chapter 3

Section 3.5: Summary of Curve Sketching

Contents

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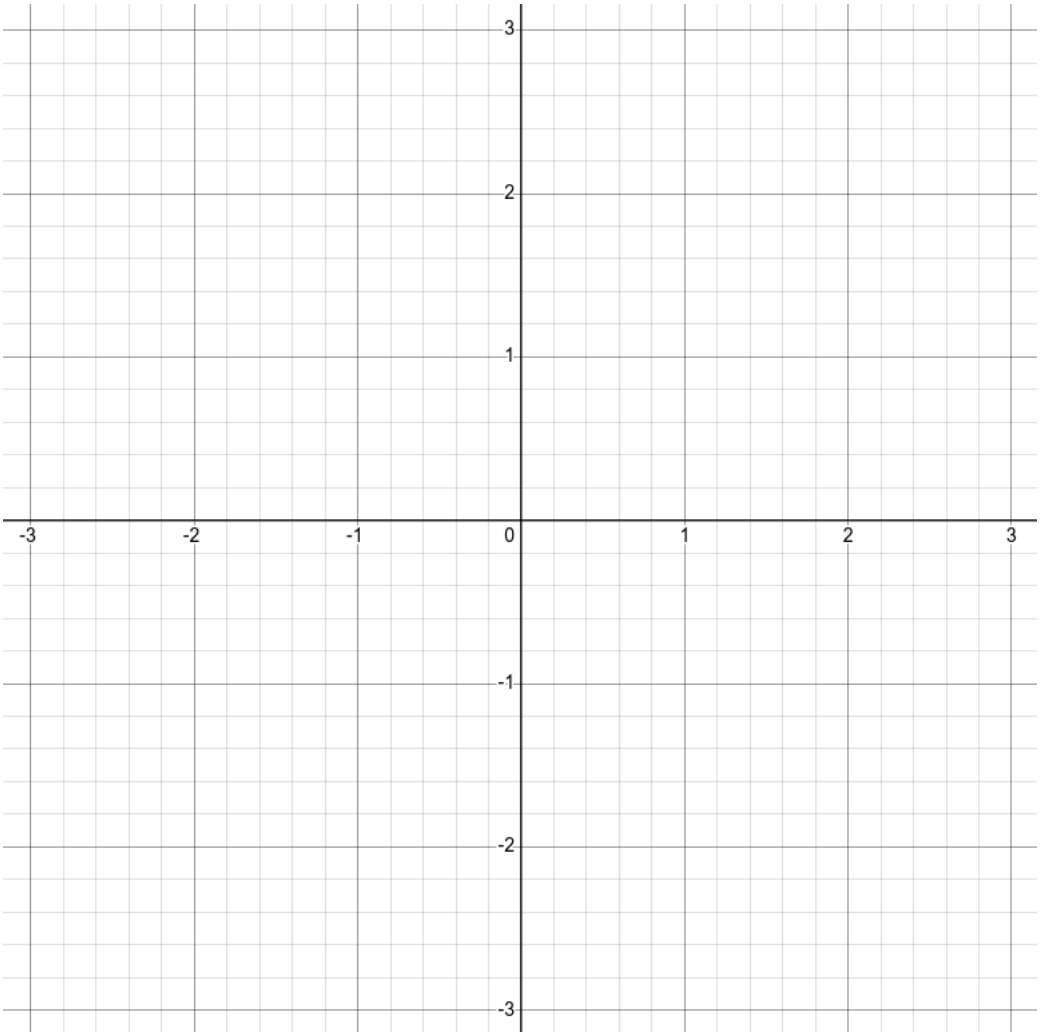
A First Example

Example 1. Sketch the curve given by $y = \dfrac{2x^2}{x^2 - 1}$.

G. Sketch



Guideline For Sketching Curves

A. Find the domain of the function.

B. Find the y-intercept and x-intercept, that is $f(0)$ and when $f(x) = 0$.

C. Search for symmetries:

- **(I)** If $f(x) = f(-x)$ for all x, then the function is even.
- **(II)** If $-f(x) = f(-x)$ for all x, then the function is odd.
- **(III)** If $f(x+p) = f(x)$ for some p and all x, then the function repeats itself after a period p.

D. Find the asymptotes:

- **(I)** The horizontal asymptotes.
- **(II)** The vertical asymptotes.

E. Find the critical numbers and the possible points of inflections.

F. Construct the table:

- **(I)** Deduce the intervals of increase and decrease.
- **(II)** Deduce the intervals of concavity.
- **(III)** Deduce the local (global) maximum values and local (global) minimum values.

G. Sketch the graph of the functions.

DIY!

Example 2. Sketch the graph of $f(x) = \dfrac{x^2}{\sqrt{x+1}}$.