Curve Sketching - Handout/Worksheet

Let us put together all the information we have learned to help us sketch graphs. We will use what we have learned about

1. Domains
2. Intercepts
3. Symmetry ($f(-x) = f(x)$ implies that $f(x)$ is an even function and symmetric about the y-axis, $f(-x) = -f(x)$ implies that $f(x)$ is an odd function and symmetric about the origin)
4. Asymptotes
   (a) For horizontal asymptotes: if $\lim_{x\to\pm\infty} f(x) = L$ then $y = L$ is a horizontal asymptote
   (b) For vertical asymptotes: if $\lim_{x\to a^{\pm}} f(x) = \infty$ or $\lim_{x\to a^{\pm}} f(x) = -\infty$ then $x = a$ is a vertical asymptote
   (c) For **rational functions** only one can locate the vertical asymptotes by finding where the denominator $= 0$ after canceling common factors.
5. Intervals of Increase or Decrease
6. Local Maximum and Minimum values
7. Concavity and Points of Inflection (where the direction of concavity changes).
8. Sketch.

Use the guidelines to sketch the curve $y = \dfrac{2x^2}{x^2 - 1}$.