

GUIDELINES FOR SKETCHING A CURVE

PROPERTIES TO LOOK FOR	EXPLANATION	$f(x) = \frac{2x^2}{x^2 - 1}$
1. Domain	<u>All</u> x where $f(x)$ is defined	$x \neq \pm 1$
2. x- and y-intercepts	x-intercepts: $f(x) = 0$ y-intercepts: $f(0)$	$x = 0$ $y = 0$
3. Symmetries	even: $f(-x) = f(x)$ odd: $f(-x) = -f(x)$ periodic: $f(x + p) = f(x)$	even
4. Asymptotes	horizontal: $y = \lim_{x \rightarrow \pm\infty} f(x)$ vertical: $x = a$ if $\lim_{x \rightarrow a^\pm} f(x) = \pm\infty$	$y = 2$ $x = -1$ and $x = 1$
5. Increases or Decreases (I/D-Test)	increases: $f'(x) > 0$ decreases: $f'(x) < 0$	$(-\infty, -1)$ and $(-1, 0)$ $(0, 1)$ and $(1, \infty)$
6. Local Maxima and Minima (1st or 2nd Derivative Test)	maximum: f' from $+$ to $-$ at $x = c$ minimum: f' from $-$ to $+$ at $x = c$	$x = 0$ none
7. Concavity and Inflections (Concavity Test)	concave upward: $f''(x) > 0$ concave downward: $f''(x) < 0$ inflection point: f'' changes sign	$(-\infty, -1)$ and $(1, \infty)$ $(-1, 1)$ none
8. Sketch the Curve		