1. Sketch the curve of the given function by answering the following parts:

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

(a) Determine the domain of $f(x)$ and determine, if they exist, any vertical and horizontal asymptotes.

D: $(-\infty, 0) \cup (0,2) \cup (2,\infty)$

V.A.: $x = 0$, $x = 2$

H.A.: $y = 0$ both $-\infty / \infty$.

(b) Use the first derivative to find intervals on which f is increasing, respectively decreasing.

$$f'(x) = \frac{-2x+2}{(x^2+2x)^2}$$

$f(x)$ inc. on $(-\infty,0) \cup (0,1)$ } $x = 1$ is

$f(x)$ dec. on $(1,2) \cup (2,\infty)$ } a rel. max

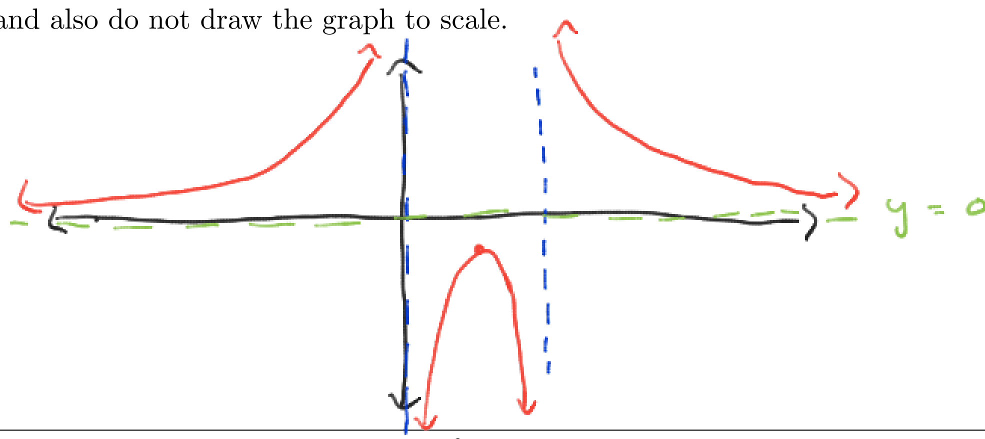
(c) Use the second derivative to find the intervals of concavity.

$$f''(x) = \frac{-2x^2+4x+2(2x-2)^2}{(x^2-2x)^3}$$ } $f'' \neq 0$

$f(x)$ is CCU on $(-\infty, 0) \cup (2, \infty)$

is CCD on $(0,2)$

(d) Use the preceding parts to sketch graph of $f(x)$. Clearly indicate all important points and details and also do not draw the graph to scale.



2. When analysing $f(x)$ we determined the following facts. Use these to sketch a graph of $f(x)$.

- $\lim_{x\to\infty} f(x) = 3$ and $\lim_{x\to-\infty} f(x) = -1$.
- $f(x)$ has vertical asymptotes at both $x = -4$ and $x = 2$.
- inc/dec $f'(x)$ is negative on $(-\infty,-4)\cup(0,2)\cup(2,\infty)$, is positive on $(-4,0)$, and is undefined at $x = 0$.
- concavity $f''(x)$ is negative on $(-\infty,-4)\cup(-4,-2)\cup(0,2)$ and is positive on $(-2,0)\cup(2,\infty)$.
- $f(x)$ passes through $(-2,0)$, $(0,4)$, and $(1,0)$.