2. $f(x)=\dfrac{2x^2-4x+2}{x^2+1}$, $f'(x)=\dfrac{4x^2-4}{(x^2+1)^2}$, $f''(x)=\dfrac{24x-8x^3}{(x^2+1)^3}$

x-int $2(x^2-2x+1)=0$

$(x-1)(x-1)=0$

$x=1$ | $x=1$

y-int $y=2$

H.A. $\lim_{x\to\infty} \dfrac{2x^2-4x+2}{x^2+1} \div \dfrac{x^2}{x^2}$

$y=2$

No V.A., No P.O.D.

Critical Values

$4(x^2-1)=0$

$(x+1)(x-1)=0$

$x=1$ | $x=-1$

+ | − | +

−1 | +1

↗ ↘ ↗

INC $(-\infty,-1)\cup(1,\infty)$

dec $(-1,1)$

Loc Max $(-1,4)$

Loc Min $(1,0)$

Hyper Critical

$8x(3-x^2)$

$x=0$ | $x=\pm\sqrt{3}$

+ | − | + | −

$-\sqrt{3}$ | 0 | $\sqrt{3}$

∪ ∩ ∪ ∩

C.Up $=(-\infty,-\sqrt{3})\cup(0,\sqrt{3})$

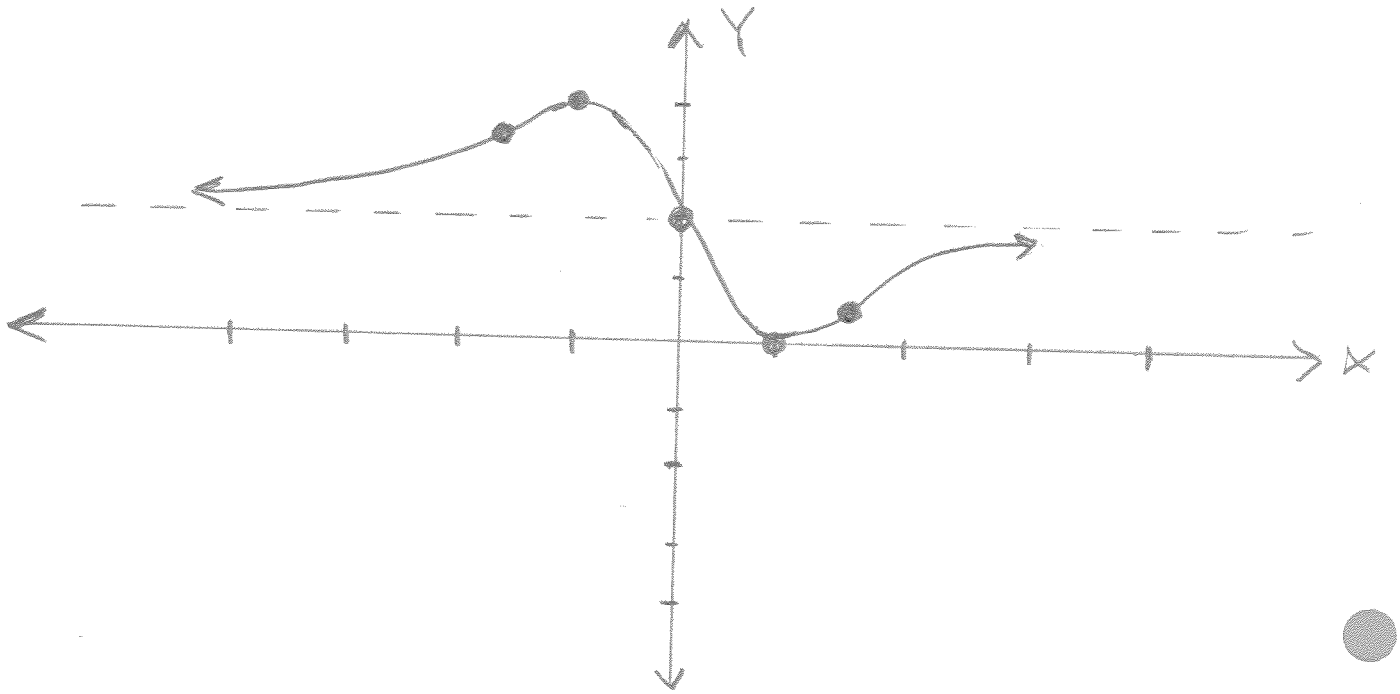
C.DN $=(-\sqrt{3},0)\cup(\sqrt{3},\infty)$

Inflection Points

$(-\sqrt{3},2+\sqrt{3})$

$(0,0)$

$(\sqrt{3},2-\sqrt{3})$



3. $f(x)=\dfrac{x^2}{(x-2)^2}$, $f'(x)=\dfrac{-4x}{(x-2)^3}$, $f''(x)=\dfrac{8x+8}{(x-2)^4}$

x-int $x^2=0$

$x=0$

y-int $(0,0)$

VA. $x-2=0$

$x=2$

$\lim_{x\to 2^+} \Rightarrow +\infty$, $\lim_{x\to 2^-} \Rightarrow +\infty$

HA $\lim_{x\to\infty} \dfrac{x^2}{(x-2)^2} \div \dfrac{x^2}{x^2}$

$y=1$

Critical

$-$ | $+$ | $-$

0 $\nearrow$ 2 $\searrow$

INC $(0,2)$

dec $(-\infty,0) \cup (2,\infty)$

$x=2$ (VA)

Loc Min $(0,0)$

Hyper Critical

$-$ | $+$ | $+$

-1 $\cup$ 2 $\cup$

$\cap$

C. Down $\Rightarrow (-\infty,-1)$

C. up $\Rightarrow (-1,2) \cup (2,\infty)$

Inflection Points

$(-1, \frac{1}{9})$