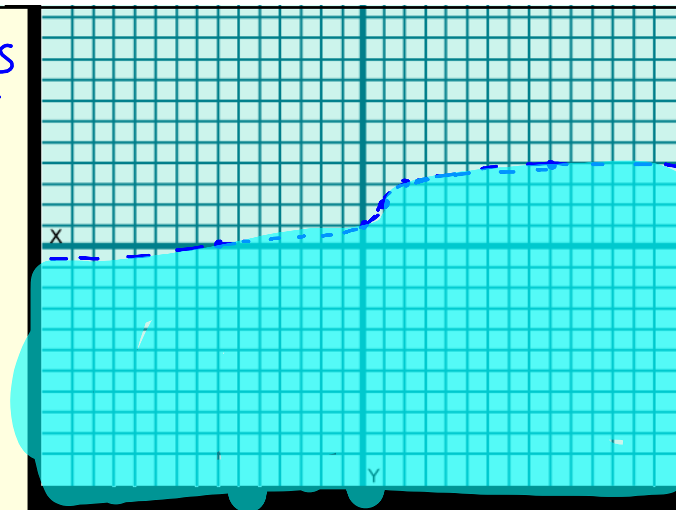
GRAPHING INEQUALITIES

$$y < \sqrt[3]{x-1} + 2$$

0	0
1	1
8	2



ASYMPTOTES – occur with rational functions

$$y = \frac{x^2+4}{x^2-4x-5}$$

$(x+1)(x-5)$

$x=-1 \quad x=5$

Vertical

$x=-1 \quad x=5$

Horizontal

$y=1$

Vertical Asymptotes

Denom = 0

x = #

Horizontal Asymptotes

1) Determine highest power in the entire fraction
2) Pull that term from the numerator & denominator & simplify.

$$y = \frac{4-3x+2x^3}{8x^3+1}$$

Vertical

$8x^3+1=0$

$8x^3=-1$

$\sqrt[3]{x^3} = \sqrt[3]{-\frac{1}{8}}$

$x=-1/2$

$\boxed{x=-1/2}$

Horiz

$$\frac{2\cancel{x^3}}{8\cancel{x^3}} = \frac{1}{4}$$

$\boxed{y=1/4}$

$$y = \frac{4x-3}{2x^2+7}$$

Vertical

$$2x^2+7=0$$

$$\sqrt{\frac{\cancel{2}x^2}{\cancel{2}}} = \sqrt{\frac{-7}{2}}$$

$\boxed{\text{None}}$

Horizontal

$$\frac{0\cancel{x^2}}{2\cancel{x^2}} = 0$$

$$\boxed{y=0}$$

$$y = \frac{5x^2-3}{4x-1}$$

Vertical

$$4x-1=0$$

$$\boxed{x=\frac{1}{4}}$$

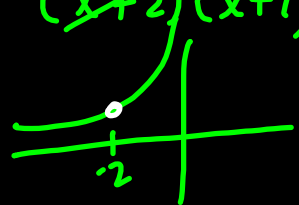
Horiz

$$\frac{5\cancel{x^2}}{0\cancel{x^2}}$$

$\boxed{\text{No Horiz.}}$

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

$$= \frac{\cancel{(x+2)}(x-2)}{\cancel{(x+2)}(x+1)}$$



Vertical

$x+1=0$

$\boxed{x=-1}$

Holes

occur when terms cancel from the num. + denom.

⇒ Set term = 0

$\boxed{\text{Hole at } x=-2}$

Horiz $\frac{x^2}{x^2}=1$

$\boxed{y=1}$

$$f(x) = \frac{2x^2-2x-12}{x^3-27} = \frac{2(x^2-x-6)}{(x-3)(x^2+3x+9)}$$

$$= \frac{2\cancel{(x-3)}(x+2)}{\cancel{(x-3)}(x^2+3x+9)}$$

Hole at $x=3$

Vertical

$\boxed{\text{None}}$

$$\frac{-3 \pm \sqrt{9-4(1)(9)}}{2(1)} \qquad \sqrt{-27}$$

Horiz $\frac{0\cancel{x^3}}{\cancel{x^3}} = 0$

$\boxed{y=0}$

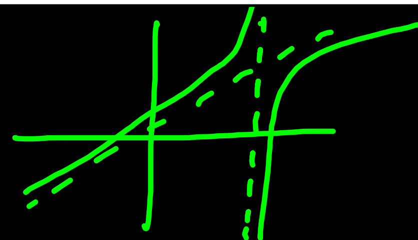
(Oblique)

Slant Asymptotes

occur when highest power in numerator is one greater than highest power in denom.

$y = mx + b$

* Find using long division



$$y = \frac{4x^2+7}{2x-1}$$

$$\begin{array}{r|l} & \;2x+1 \\ \hline 2x-1 & \;\cancel{4x^2}+0x+7 \\ & -\cancel{4x^2}+2x \\ \hline & \qquad 2x+7 \end{array}$$

$$\boxed{y = 2x+1}$$