GRAPHING INEQUALITIES

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

$\geq$ solid

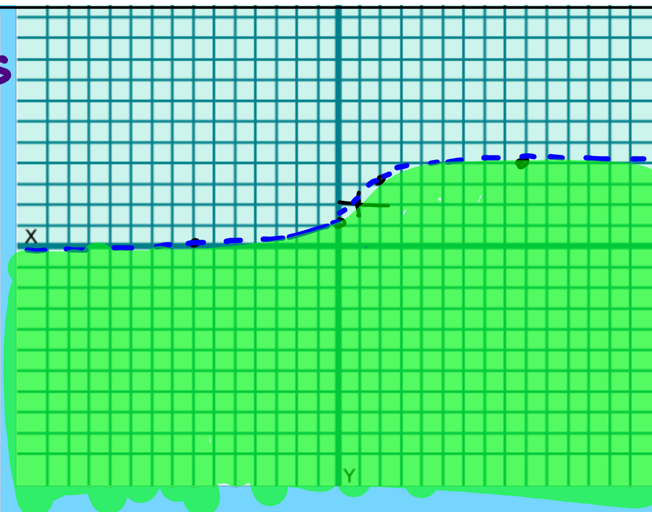
$>$ dottd

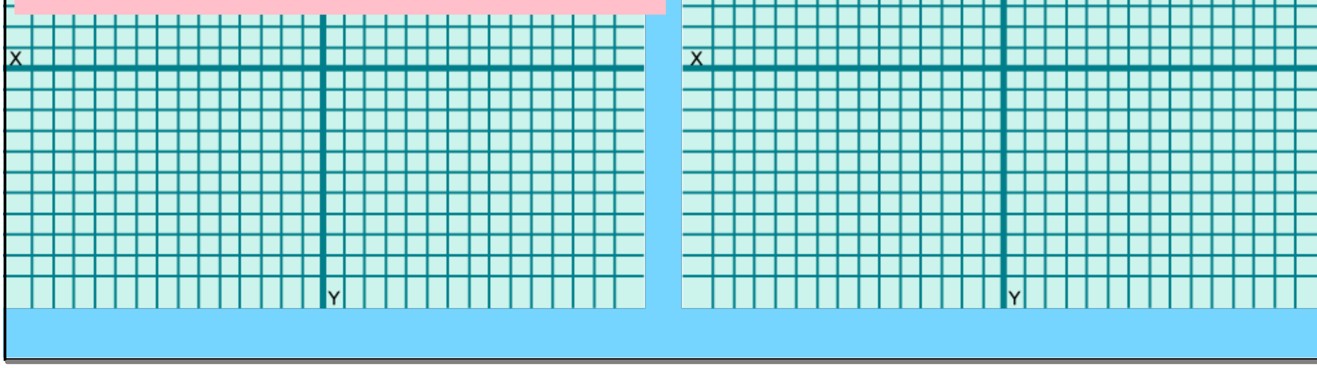
0	0
1	1
8	2

Shade!

$y <$ shade below

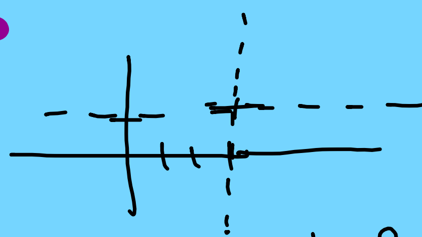
$y >$ shade above





Asymptotes

$$y = \frac{2}{x-3} + \frac{1(x-3)}{1(x-3)}$$



$$\frac{2 + x - 3}{x-3} = \frac{4x^1 - 1}{2x^1 - 3} = \frac{2}{0}$$

Vertical

$x = 3$

Horiz

$\frac{4x}{2x} = \cancel{1}\,2$

$y = 1$

Vertical Asymp

Denom = 0

$x = \#$

Infinitely many are possible

Horizontal Asymp

* Determine the highest power in the problem & pull that term from the numerator & denominator.

$y = \#$

2 are possible if √

1 otherwise.

Find all horiz. + vertical asymptotes

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

Vertical

$2x^2-8=0$

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

$2(x+2)(x-2)=0$

$x=-2,2$

$\boxed{x=2 \quad x=-2}$

Horizontal

$\frac{3\cancel{x^2}}{2\cancel{x^2}}$

$\boxed{y=\frac{3}{2}}$

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

Vertical

$2x^2+7=0$

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

None

Horiz

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

$\boxed{y=0}$

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

Vertical

$4x-1=0$

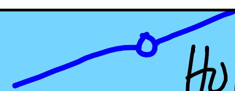
$\boxed{x=\frac{1}{4}}$

Horiz.

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

$\boxed{\text{None}}$

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

Vertical  **Holes**

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

When terms cancel from the num. & denom.

Horizontal

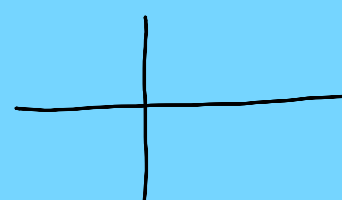
$$\frac{\cancel{x^2}}{\cancel{x^2}} = 1$$

Asymp.

$x=-1$ $\quad \cancel{x=-2}$

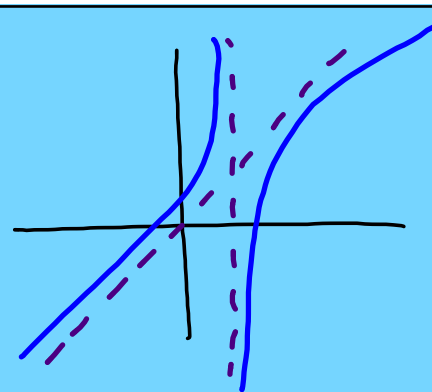
Hole at $x=-2$

$y=1$



September 12, 2022

Slant Asymptotes



- occur when the numerator is one power higher than the denom.
- Cannot have horiz & slant asymp. in same graph
- long division

$$f(x) = \frac{4x^2+7}{2x-1}$$

No Horiz $\frac{4\cancel{x^2}}{0\cancel{x^2}}$

Vertical $2x-1=0$

$\boxed{x = 1/2}$

Slant = $y = mx + b$

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

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