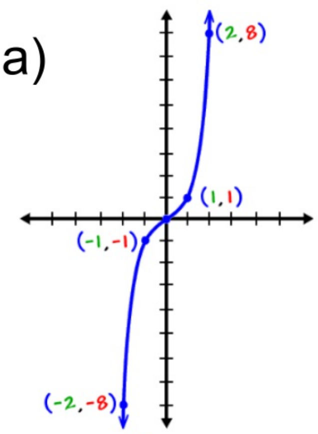
IB Math Studies 2 BELL WORK

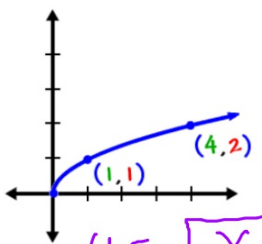
Write the equation of each parent function shown.

a)



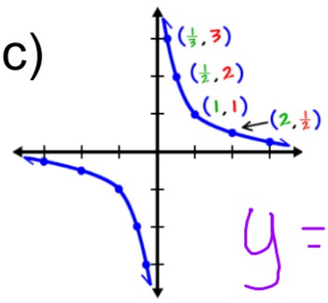
$y = x^3$

b)



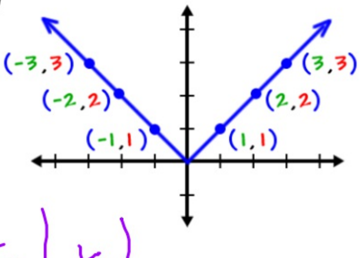
$y = \sqrt{x}$

c)



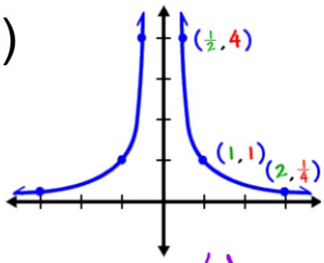
$y = \frac{1}{x}$

d)



$y = |x|$

e)



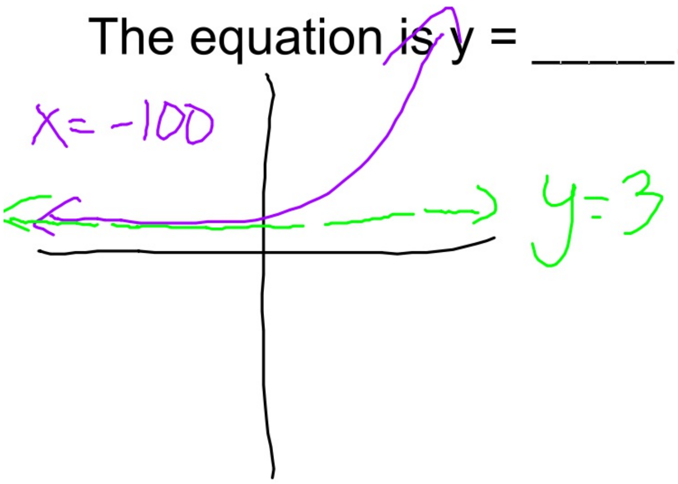
$y = \frac{1}{x^2}$

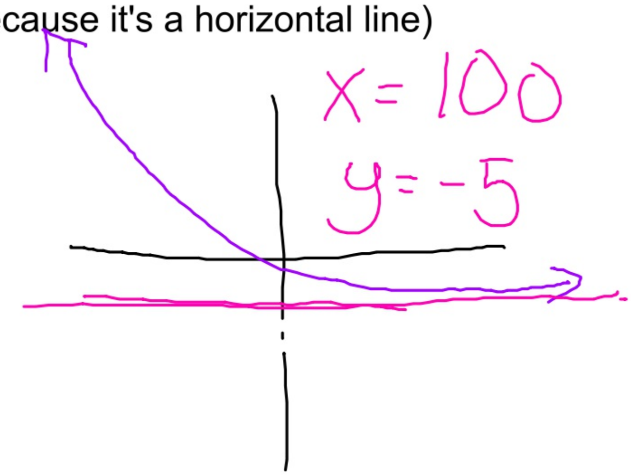
B ASYMPTOTES

An **asymptote** is a line which a function gets closer and closer to but never quite reaches.

To determine a horizontal asymptote, consider the behavior of the graph as $x \to \pm\infty$

The equation is y = ______. (because it's a horizontal line)





Determine the equation of the horizontal asymptote for the function.

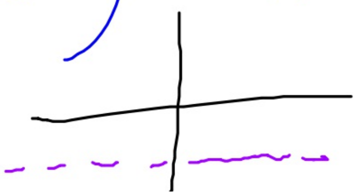
a) $g(x) = 3 + \left(\frac{2}{x-1}\right)$ $\quad 3 + \left(\frac{2}{\text{big} - 1}\right) \to 0$

$y \to 3$ $\qquad \frac{2}{100} \quad \frac{2}{1000}$

b) $y = \frac{6}{x+2} - 4$ $\to \emptyset$

Asymptote = $y = -4$

c) $y = \frac{-5x \cancel{+ 1}}{2x \cancel{- 1}}$ $\quad \frac{-5(\cancel{\infty})}{2(\cancel{\infty})}$ $\quad y = -\frac{5}{2}$



VERTICAL ASYMPTOTES

The graph of $g(x) = 3 + \dfrac{2}{x-1}$ is given for the domain $-5 \leqslant x \leqslant 5$.

We observe there is a 'jump' or *discontinuity* in the graph when $x = 1$.

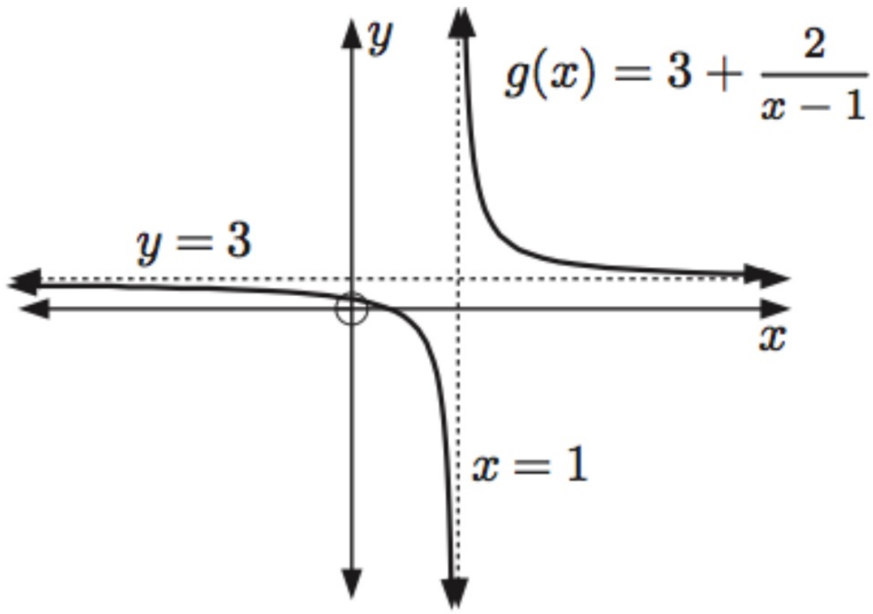
This occurs because

$$g(1) = 3 + \frac{2}{1-1} \quad = 3 + \frac{2}{0}$$

which is undefined.

For functions which contain a fraction, a vertical asymptote occurs when the denominator is zero.

We can now display a complete graph of the function $g(x) = 3 + \dfrac{2}{x-1}$, including both horizontal and vertical asymptotes.



Consider the function $y = \frac{1}{x+2} + 4$.

a Find the asymptotes of the function. **b** Find the axes intercepts.

c Sketch the function, including the features from **a** and **b**.

horizontal asymptote: plug in large (or small) # for X

vertical asymptote: Set denominator = Ø

y-int: set $x = 0$

x-int: set $y = 0$

Consider the function $y = \dfrac{1}{x+2} + 4$.

a Find the asymptotes of the function. **b** Find the axes intercepts.

c Sketch the function, including the features from **a** and **b**.

a. $y=4$ $X = -2$

b. X-int $= -2.25$

y-int $= 4.5$

domain

X = all real #'s

$X \neq -2$

range:

Exercise 19 B #1, 3