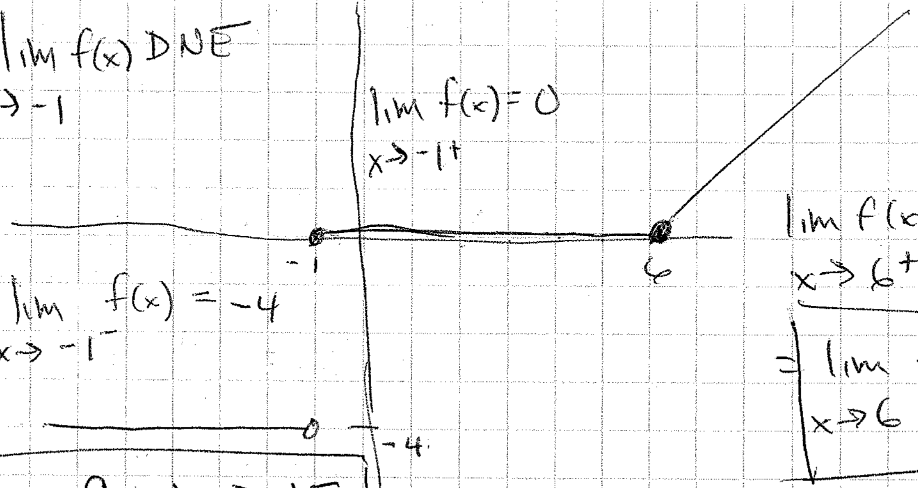
Quiz 3 Key

$$f(x) = \begin{cases} -4, & x < -1 \\ 0 & -1 \le x < 6 \\ x-6 & x \ge 6 \end{cases}$$



$\lim_{x \to -1} f(x)$ DNE

$\lim_{x \to -1^+} f(x) = 0$

$\lim_{x \to -1^-} f(x) = -4$

$\lim_{x \to 6^+} f(x) = \lim_{x \to 6^-} f(x)$

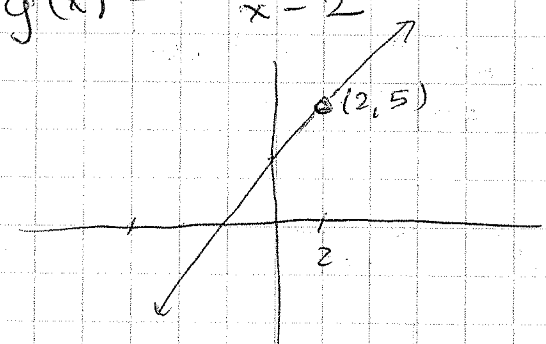
$= \boxed{\lim_{x \to 6} f(x) = 0}$

$\boxed{\lim_{x \to -1} f(x) \text{ DNE}}$

$$g(x) = \frac{x^2+x-6}{x-2} = \frac{\cancel{(x-2)}(x+3)}{\cancel{(x-2)}} = x+3$$

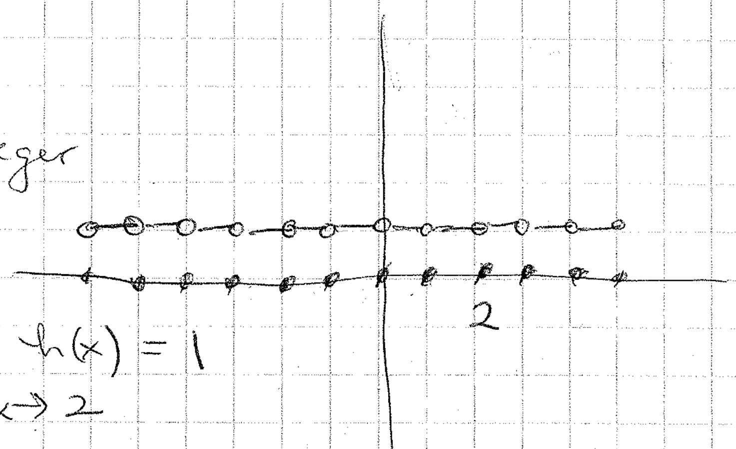
(line with hole at $x = +2$)

$y = 2+3 = 5$)



$\lim_{x \to 2^-} g(x) = \lim_{x \to 2^+} g(x) = \boxed{\lim_{x \to 2} g(x) = 5}$

$$h(x) = \begin{cases} 0, & x \text{ integer} \\ 1 & x \text{ non-integer} \end{cases}$$



$\lim_{x \to 2^+} h(x) = 1$

$\lim_{x \to 2^-} h(x) = 1$

$\Rightarrow \lim_{x \to 2} h(x) = 1$

However, $h(2) = 0$.

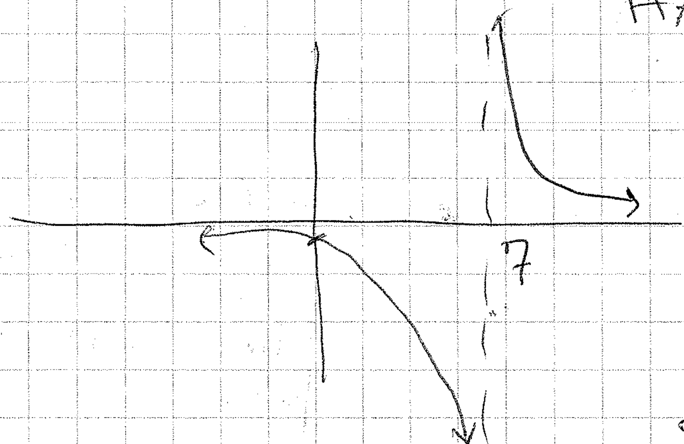
Since $\lim_{x \to 2} h(x) = h(2)$, h is not cts at $x = 2$

$$f(t) = \frac{t+7}{t^2-49} = \frac{\cancel{(t+7)}}{(t-7)\cancel{(t+7)}} = \frac{1}{t-7}$$

Dom: $t \neq 7, -7$

VA: $t = 7$

HA: Like $f(x) = \frac{1}{x}$, it's the x axis.



Always plot $t(0)$ (the t-axis intercept)

$$t(0) = \frac{1}{0-7} = -\frac{1}{7}$$

This helps you see where the curves should be on either side of the asymptotes.

$$\lim_{t \to 7^-} f(t) = -\infty \qquad \lim_{t \to 7^+} f(t) = +\infty$$

I wrote t on the test + t(x), which was nonsense.

$$\lim_{t \to 7} f(t) \text{ DNE}$$

If you graphed it first as I did here, you'd see the limits. But finding a limit w/o graphing entails computation of values approaching $t = 7$ from both sides. It's good to be able to do this to convince yourself of the analysis.

$f(6.5) = -2$, $f(6.9) = -10$ etc, fcn ↘

$f(7.5) = 2$, $f(7.1) = 10$ etc fcn ↗