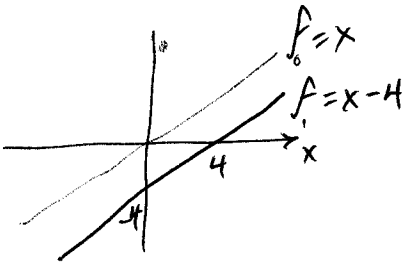
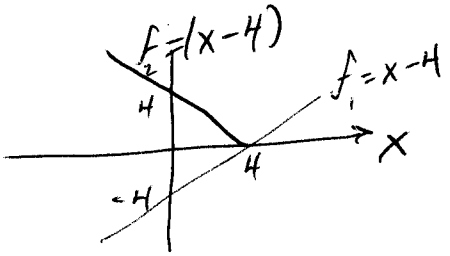
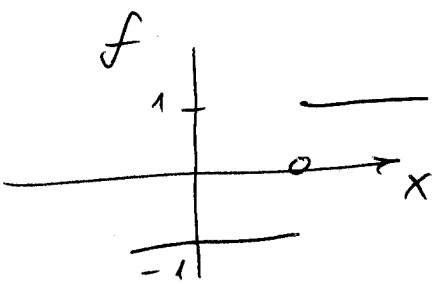
2.2 #20 Find limits of $f = \frac{|x-4|}{x+4}$.

First, graph:

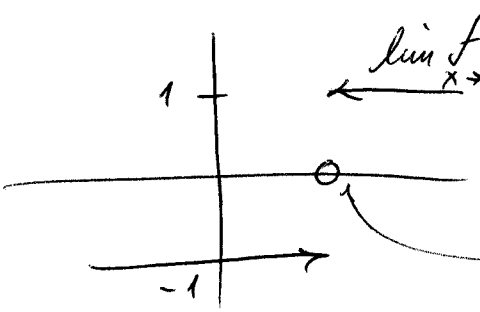






$f = \frac{|x-4|}{(x-4)}$

Then evaluate limits:



2.3 #14 Find $g'(x \neq 2)$ for $g = \frac{1}{x}$

First find $g' = \frac{dg}{dx} = \lim_{\Delta x \to 0} \frac{\Delta g}{\Delta x} = \lim_{\Delta x \to 0} \frac{g(x+\Delta x) - g(x)}{\Delta x}$

$g(x+\Delta x) = \frac{1}{x+\Delta x}$ $\quad g(x) = \frac{1}{x}$

multiply by 1 to get common denom.

$g(x+\Delta x) - g(x) = \frac{1}{x+\Delta x} - \frac{1}{x} = \left(\frac{x}{x}\right)\frac{1}{x+\Delta x} - \frac{1}{x}\left(\frac{x+\Delta x}{x+\Delta x}\right)$

$\Delta g = \frac{x - (x+\Delta x)}{x(x+\Delta x)} = \frac{-\Delta x}{x^2 + x\Delta x}$

$\frac{\Delta g}{\Delta x} = \frac{-\Delta x}{x^2 + x\Delta x}\left(\frac{1}{\Delta x}\right) = \frac{-1}{x^2 + x\Delta x}$

$\lim_{\Delta x \to 0} \frac{\Delta g}{\Delta x} = \lim_{\Delta x \to 0} \left(\frac{-1}{x^2 + x\cancel{\Delta x}^{0}}\right) = \frac{-1}{x^2} = \frac{dg}{dx}$

Now evaluate $\frac{dg}{dx}$ at $x = 2$:

$g'(2) = -\frac{1}{2^2} = -\frac{1}{4}$