1. Justify

$$\lim_{x\to 5} \frac{x^2-6x+5}{x-5} = 4$$

using the "Limits don't care about one point" rule.

$$\lim_{x\to 5} \frac{x^2-6x+5}{x-5} = \lim_{x\to 5} \frac{(x-5)(x-1)}{(x-5)}$$

limits don't care

$$= \lim_{x\to 5} x-1$$

direct subs.

$$= 5-1$$

$$= 4$$

2. Compute

$$\lim_{h\to 0} \frac{\sqrt{4+h}-2}{h}$$

using the "Limits don't care about one point" rule. Hint: Multiply top and bottom by $\sqrt{4+h}+2$ early in the computation.

$$\lim_{h\to 0} \frac{\sqrt{4+h}-2}{h} = \lim_{h\to 0} \frac{\sqrt{4+h}-2}{h}\,\frac{\sqrt{4+h}+2}{\sqrt{4+h}+2}$$

$$= \lim_{h\to 0} \frac{4+h-4}{h(\sqrt{4+h}+2)}$$

limits don't care

$$= \lim_{h\to 0} \frac{h}{h(\sqrt{4+h}+2)}$$

$$= \lim_{h\to 0} \frac{1}{\sqrt{4+h}+2} = \frac{1}{\sqrt{4+0}+2} = \frac{1}{4}$$

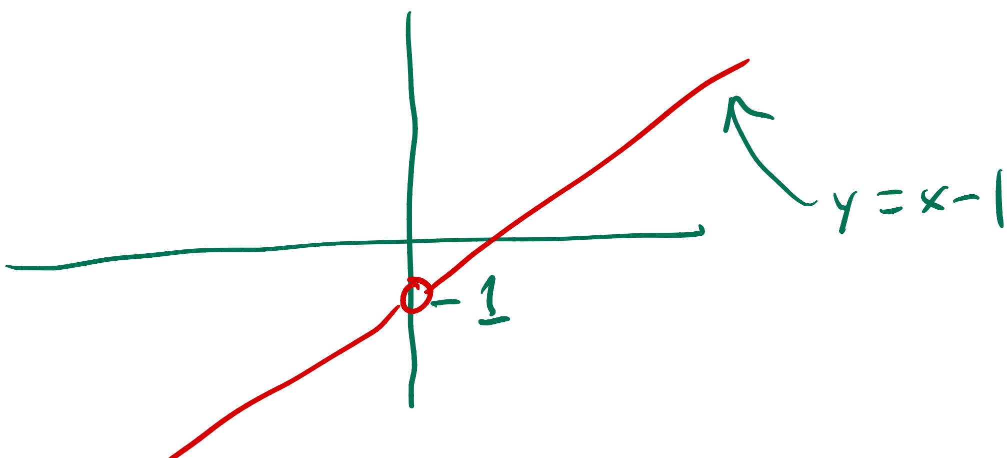
3. Suppose $f(x) = x\left(1 - \frac{1}{x}\right)$

a) Why is 0 not in the domain of $f(x)$?

$1/0$ is not defined

b) Sketch the graph of $f(x)$.

Since $x\left(1-\frac{1}{x}\right) = x - 1$ except at $x = 0$



c) Compute $\lim_{x\to 0} f(x)$.

$$\lim_{x\to 0} x\left(1-\frac{1}{x}\right) = \lim_{x\to 0} x - 1 = -1$$

limits don't care!