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1. Find

$$\lim_{x \rightarrow 3} \frac{x^2 - x - 6}{x - 3} = \lim_{x \rightarrow 3} \frac{(x-3)(x+2)}{x-3} = \lim_{x \rightarrow 3} x+2 = 5$$

2. Is $f(x)$ continus function (find points of discountinity and what type of discountinity if any)

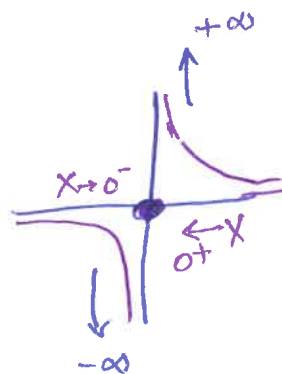
$$f(x) = \begin{cases} \frac{1}{x} & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases}$$

$$\lim_{x \rightarrow 0^+} \frac{1}{x} = \infty ; \quad \lim_{x \rightarrow 0^-} \frac{1}{x} = -\infty$$

$$f(0) = 0$$

Infinite discount.
at $x=0$

So the function is cont $\forall x \in \mathbb{R}$
except at $x=0$



3. Find

$$\lim_{x \rightarrow -\infty} \frac{\sqrt{5x^2 - 2}}{x+3}$$

$$= \lim_{x \rightarrow -\infty} \frac{\sqrt{5x^2 - 2}}{(x+3)/x} \quad \text{negative } x = -\sqrt{x^2}$$

$$= \lim_{x \rightarrow -\infty} \frac{\sqrt{-5 \lim_{x \rightarrow -\infty} \frac{x^2}{x^2} - \lim_{x \rightarrow -\infty} \frac{2}{x^2}}}{\lim_{x \rightarrow -\infty} \frac{x}{x} + \lim_{x \rightarrow -\infty} \frac{3}{x}}$$

$$= -\sqrt{5}$$