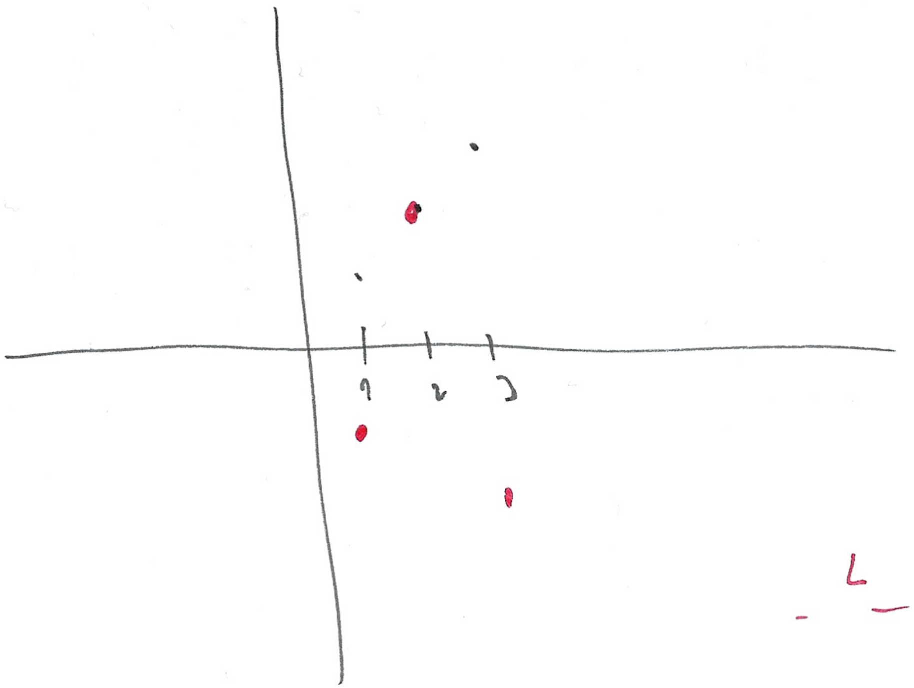
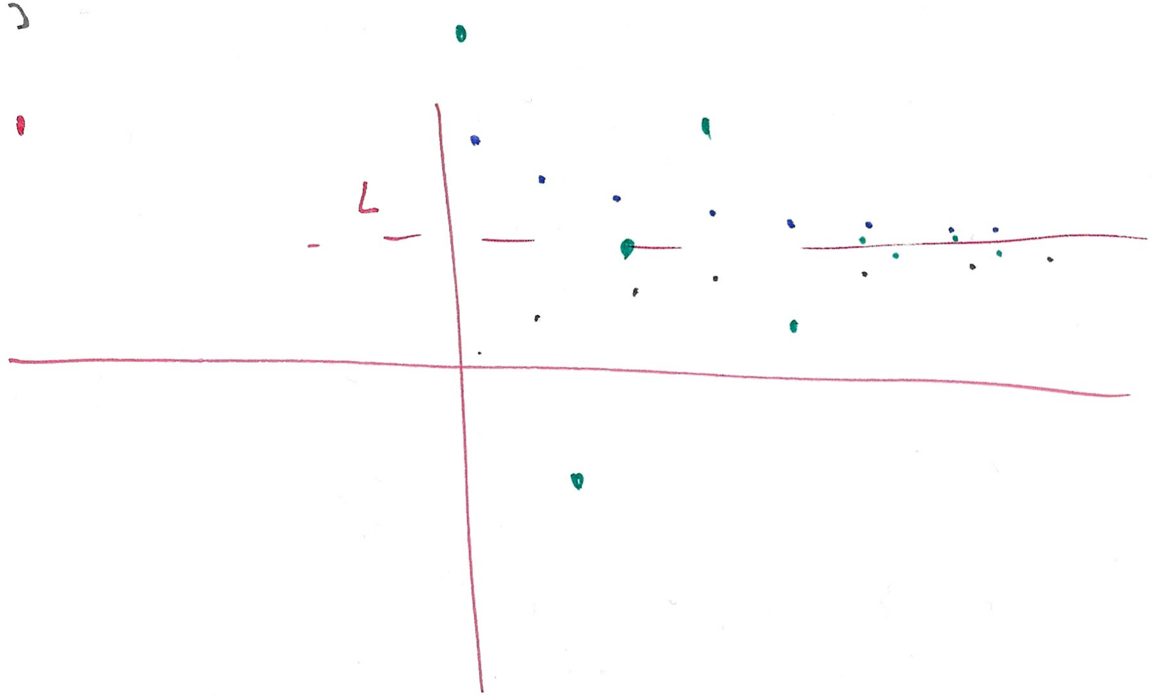
$\{n\}_{n=1}^{\infty}$

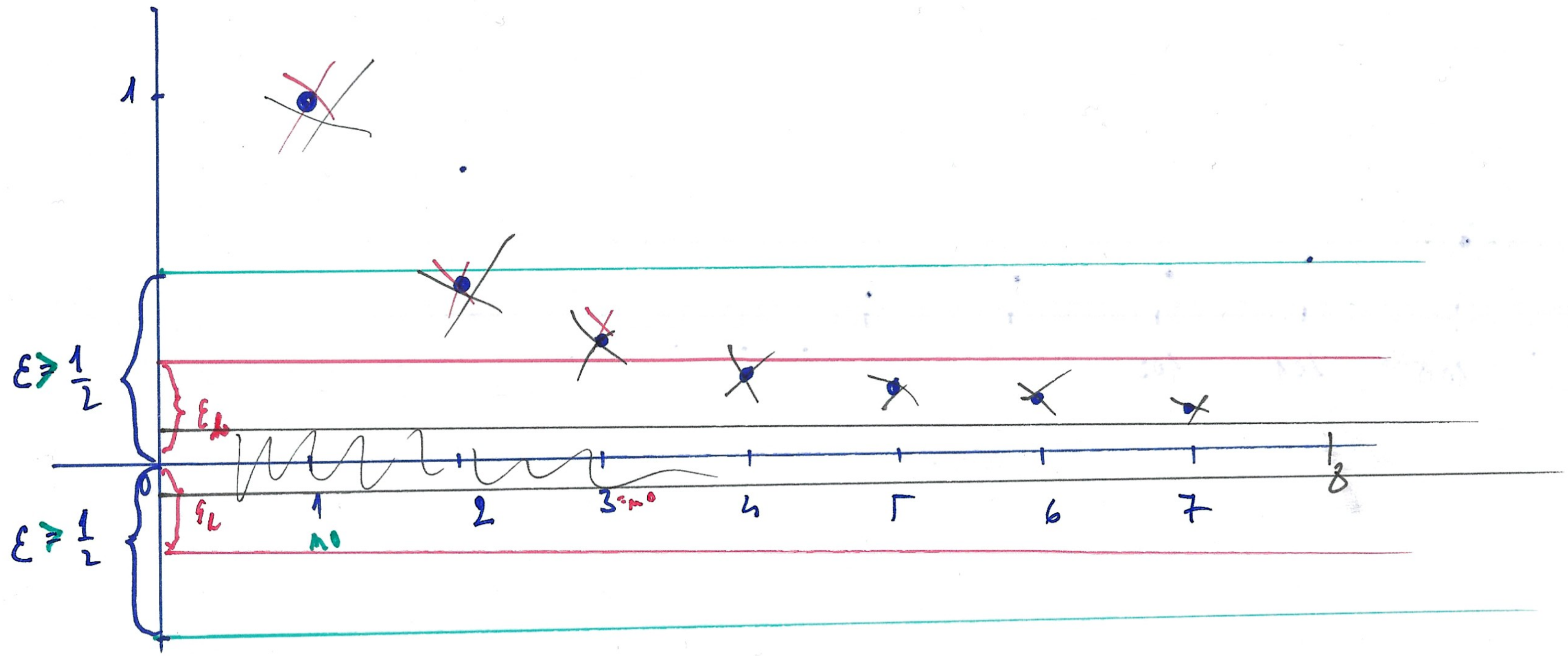
$\{(-1)^n \cdot n\}_{n=1}^{\infty}$

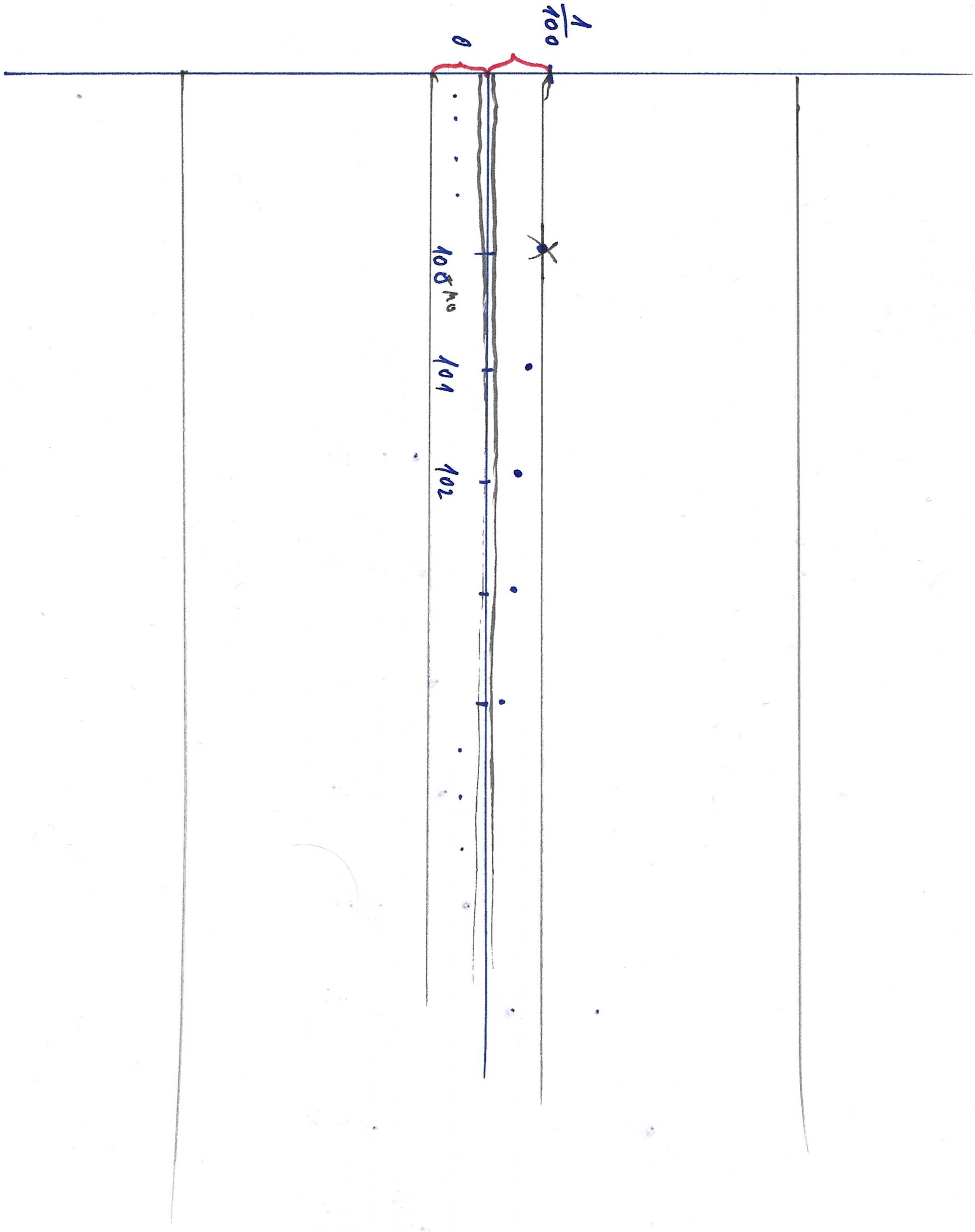


$\frac{1}{n}$

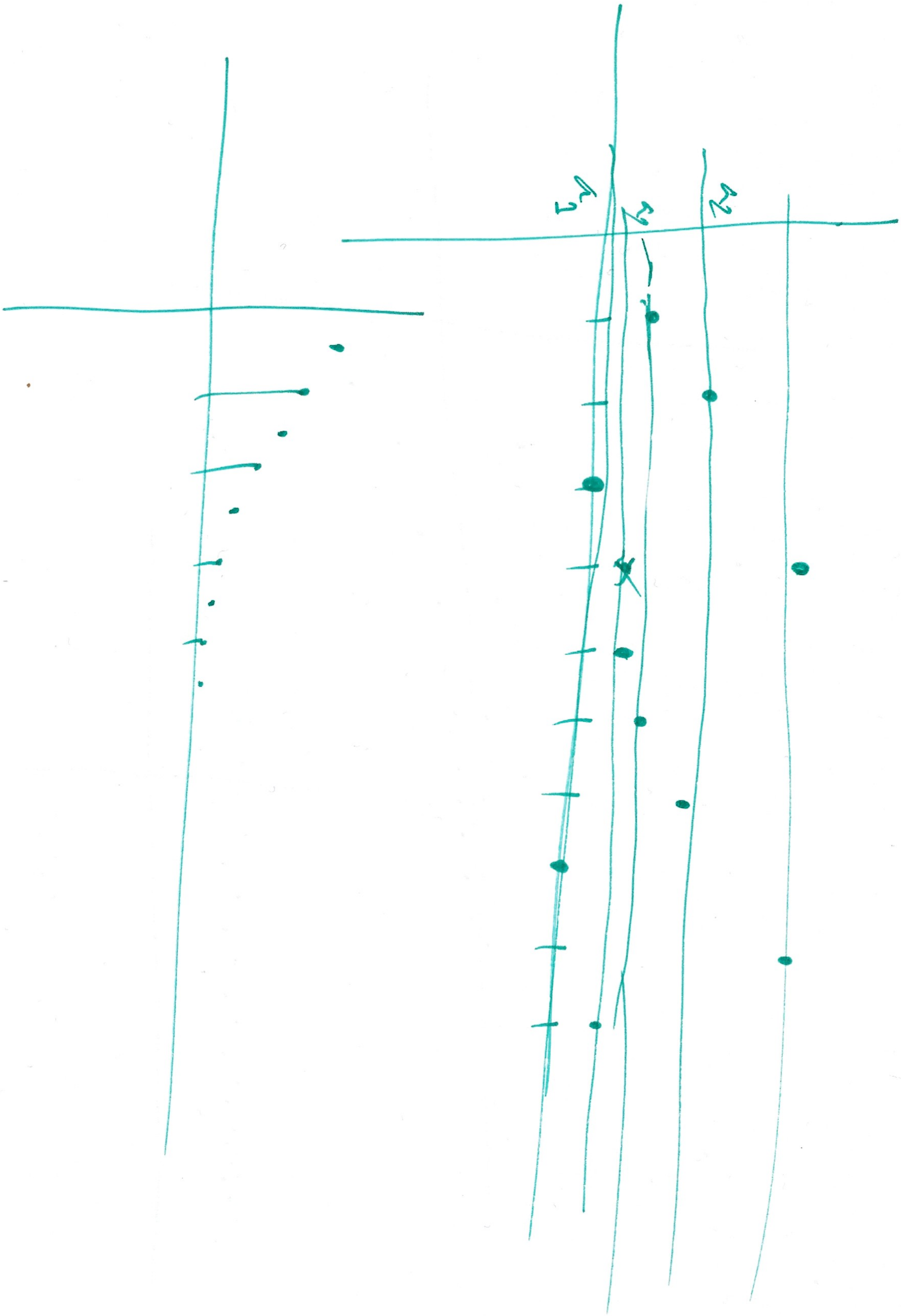


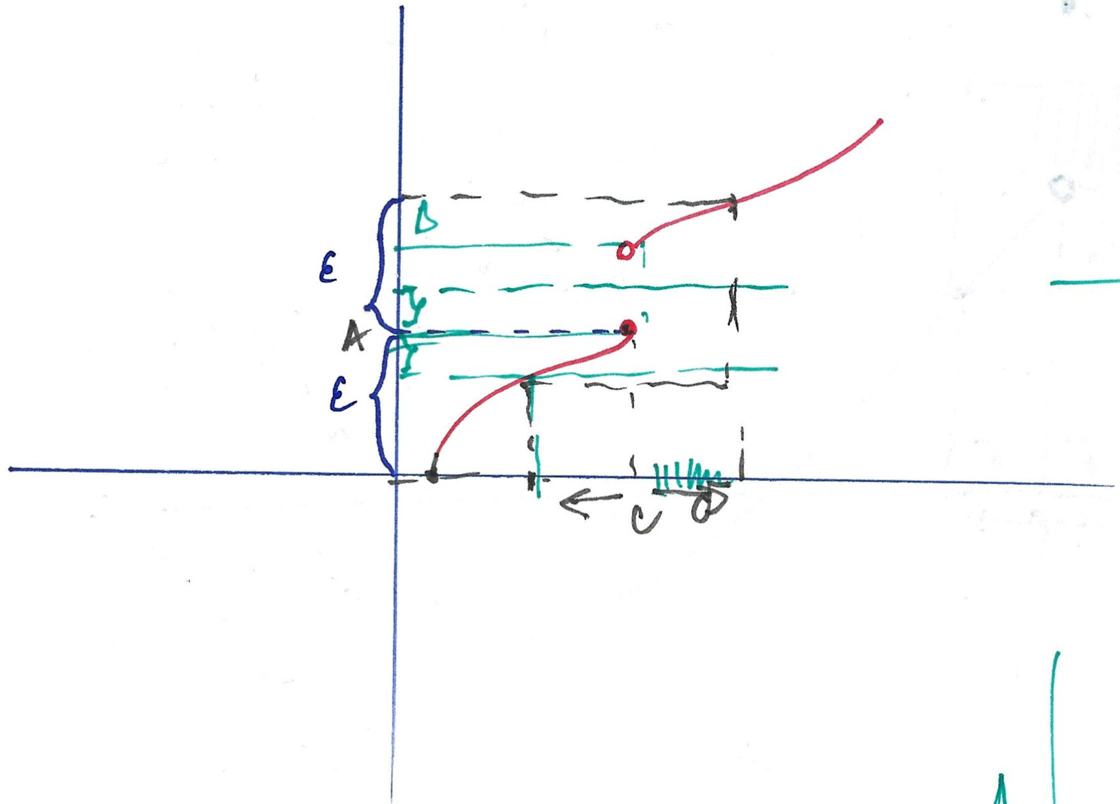
$\left\{\frac{1}{n}\right\}_{n=1}^{\infty}$

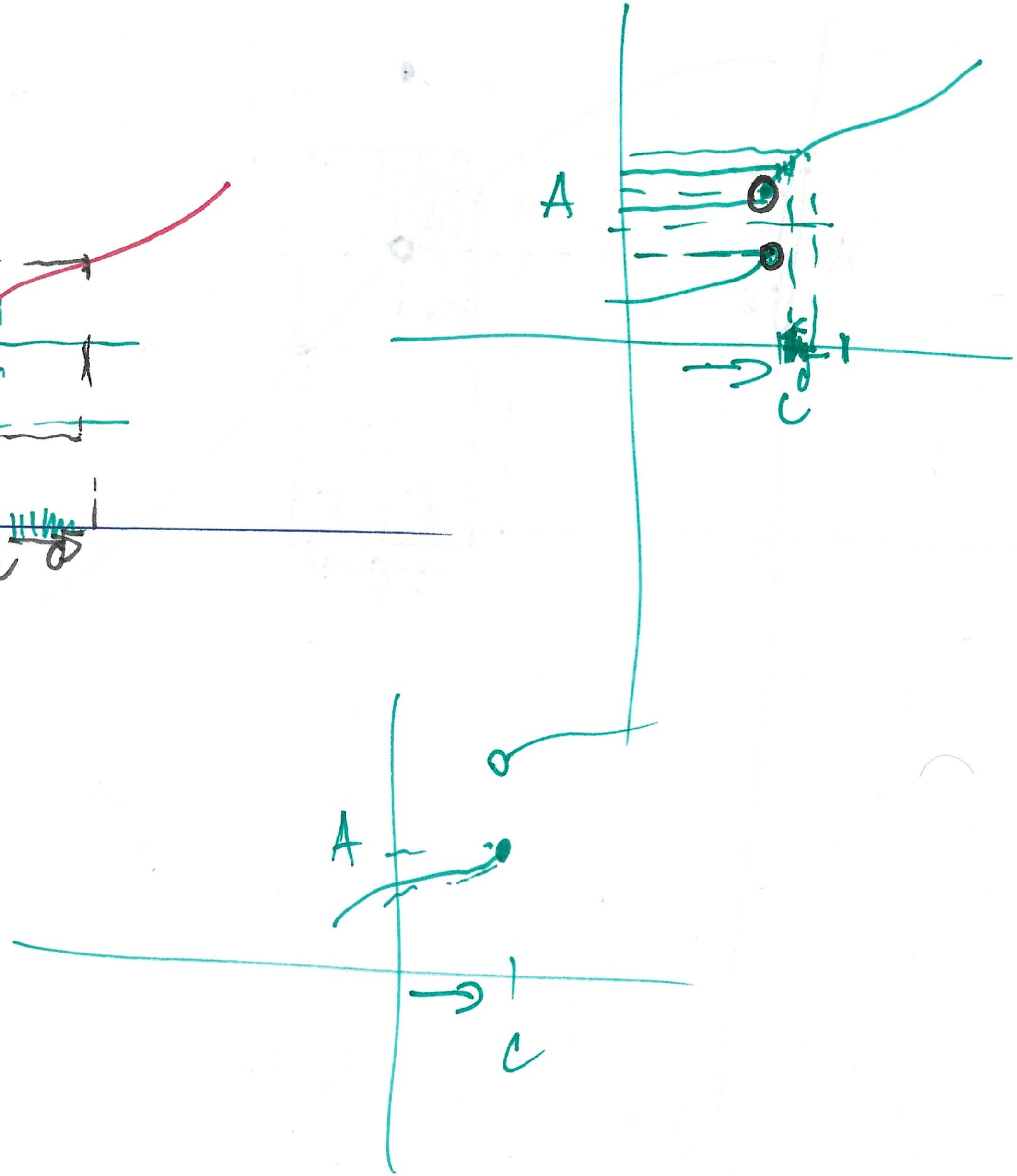


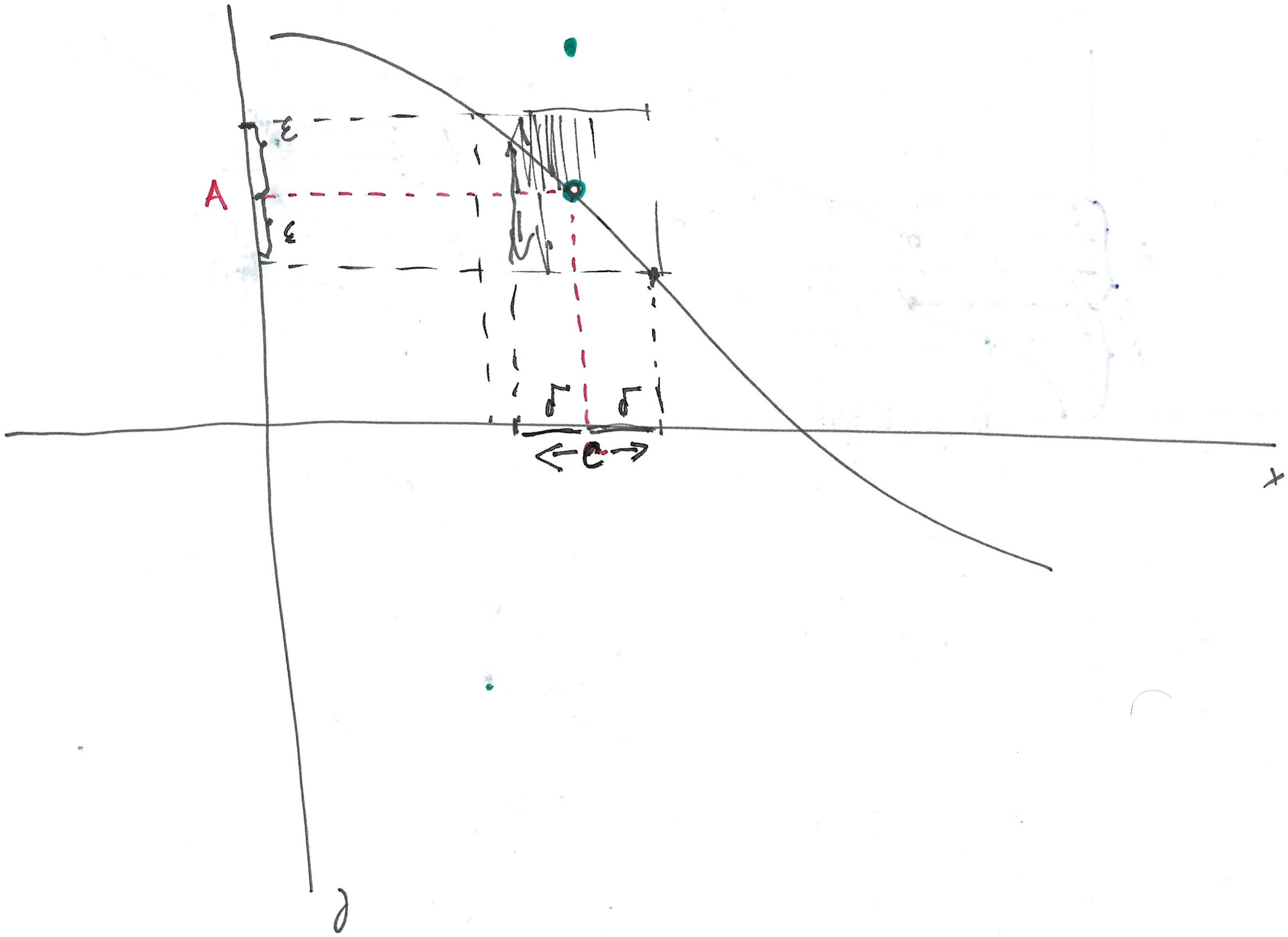


0
1/100
100
101
102

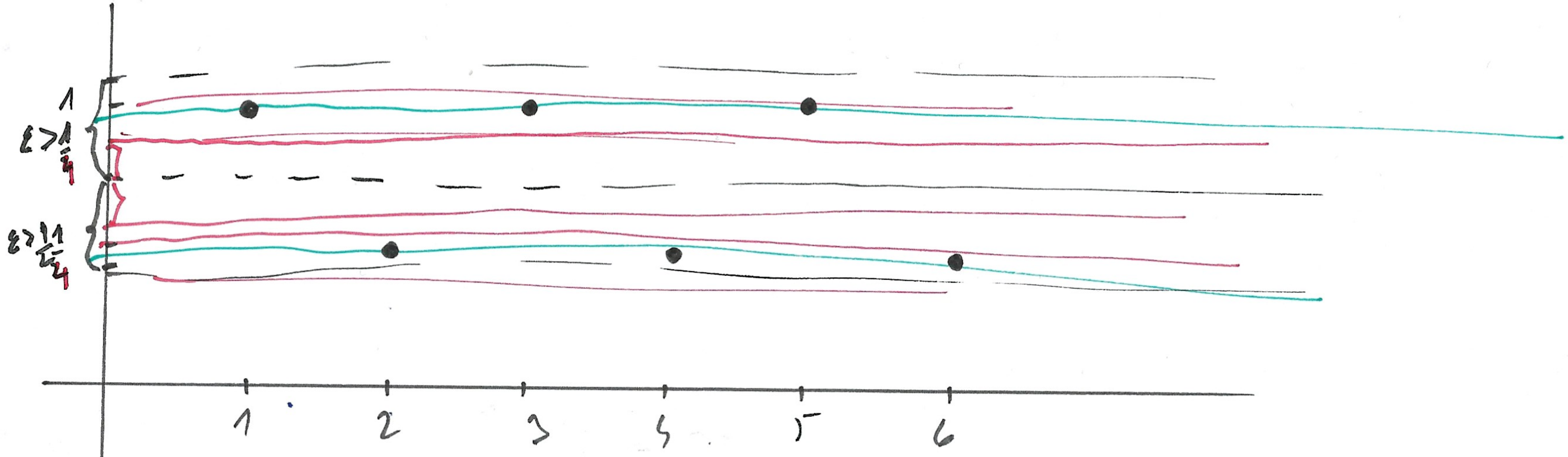



ε
A
ε
C


A
C
A
C



A
ε
ε
δ
δ
c
x

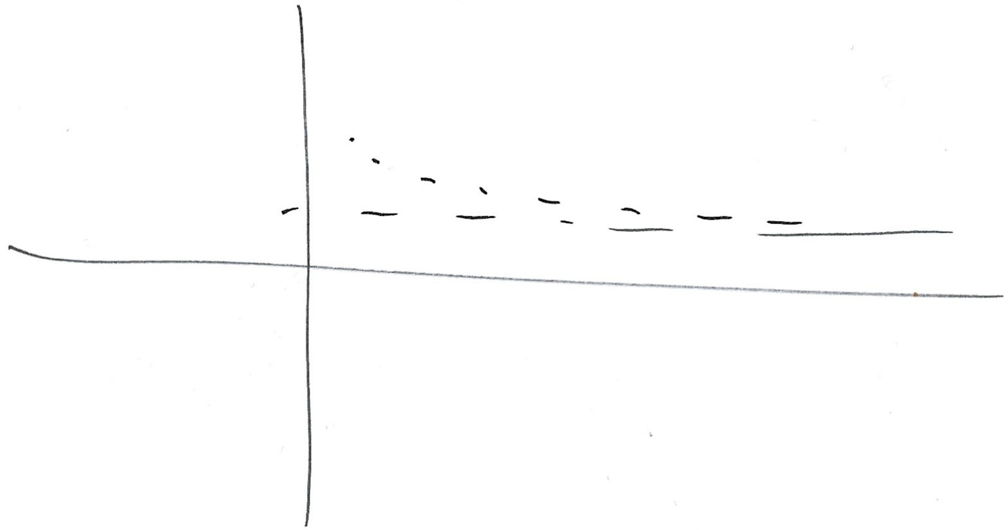


a_n ; $n=2k$

$\to \frac{1}{2}$

a_n $n=2k+1$

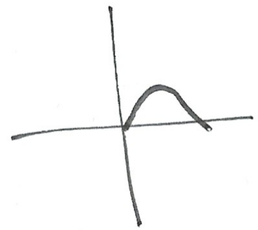
$\to 1$



$$\lim_{x \to 0^+} \frac{\sin x}{x} = 1$$

$\langle 0, \frac{\pi}{2})$

$$\sin x \leq x \leq \operatorname{tg} x$$



$$\sin x \leq x \leq \frac{\sin x}{\cos x}$$

$$\frac{\sin x}{\sin x} \leq \frac{x}{\sin x} \leq \frac{\frac{\sin x}{\cos x}}{\sin x}$$

$$\frac{\frac{\cancel{\sin x}}{\cos x}}{\frac{\cancel{\sin x}}{1}}$$

$$\frac{1}{3} \leq \frac{1}{2}$$

$$3 \geq 2$$

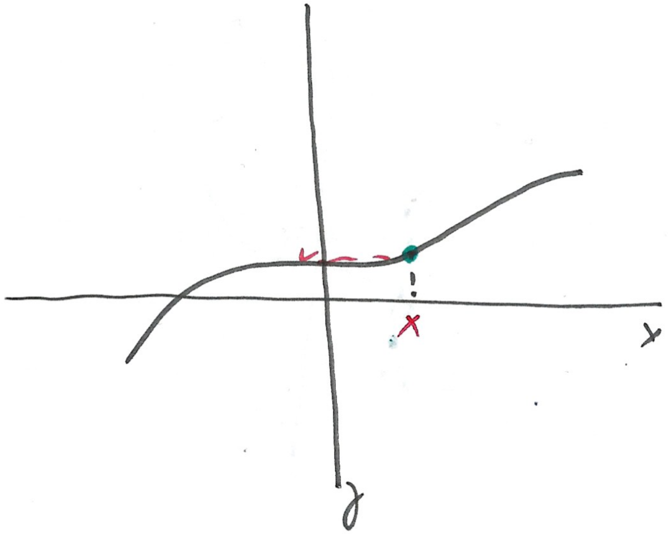
$$\frac{\sin x}{\sin x} \leq \frac{x}{\sin x} \leq \frac{1}{\cos x}$$

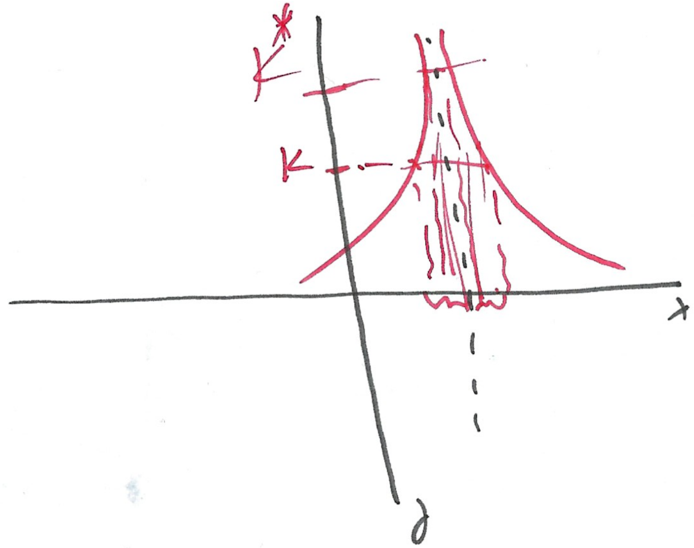
$$\frac{\sin x}{\sin x} \geq \frac{\sin x}{x} \geq \cos x$$

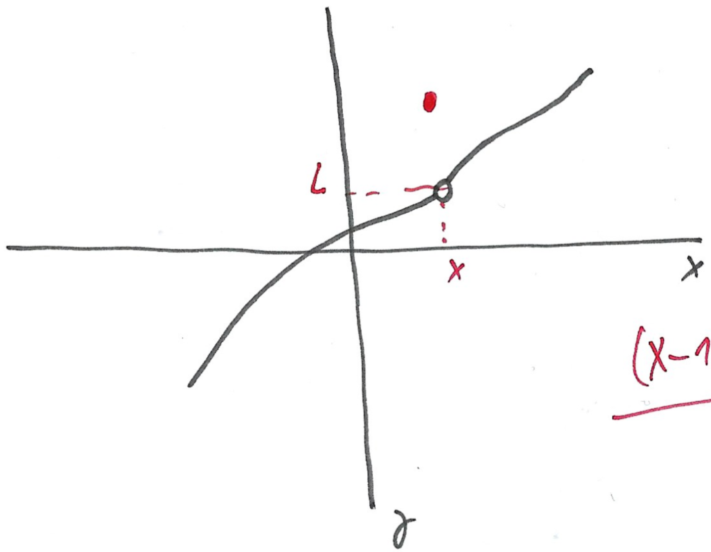
$$\downarrow \qquad \downarrow \qquad \downarrow$$

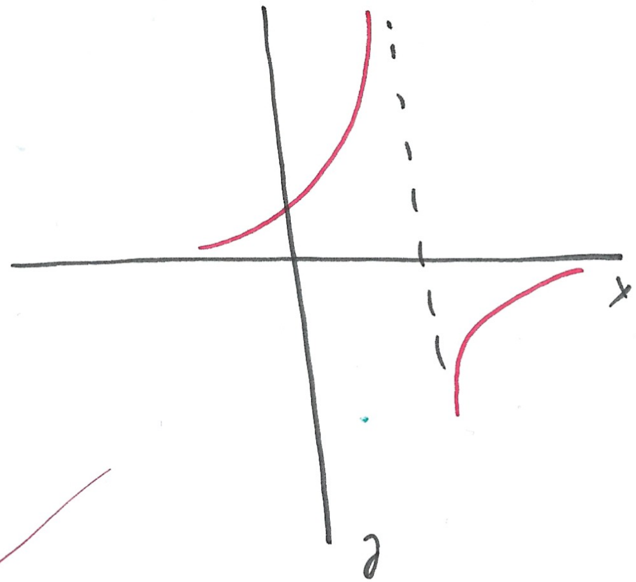
$$1 \qquad 1 \qquad 1$$

LIMITA VO VLASTNOM BODE

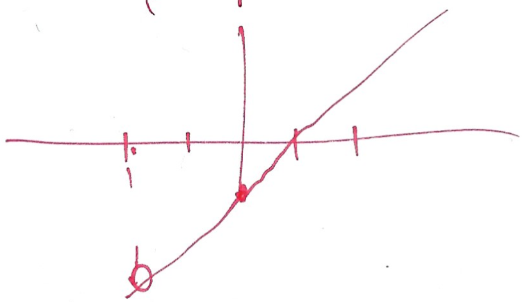




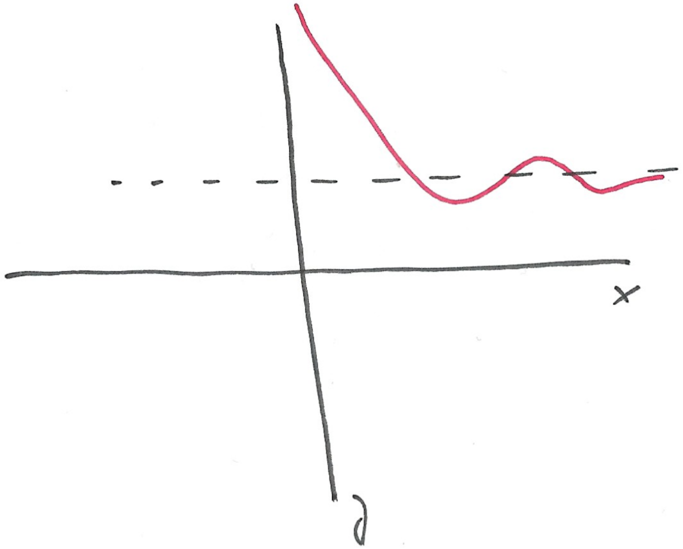


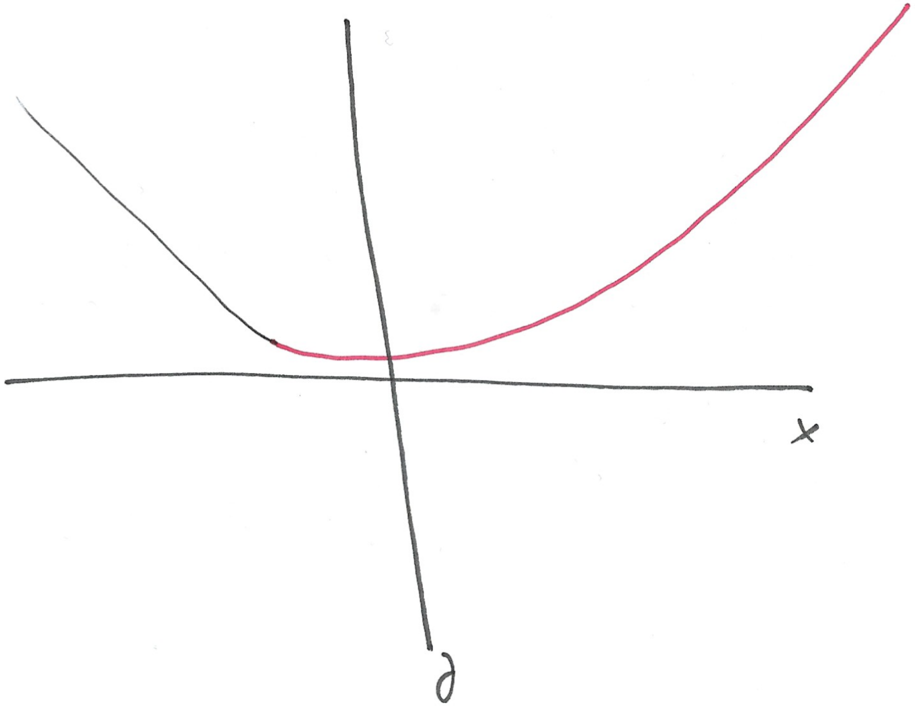


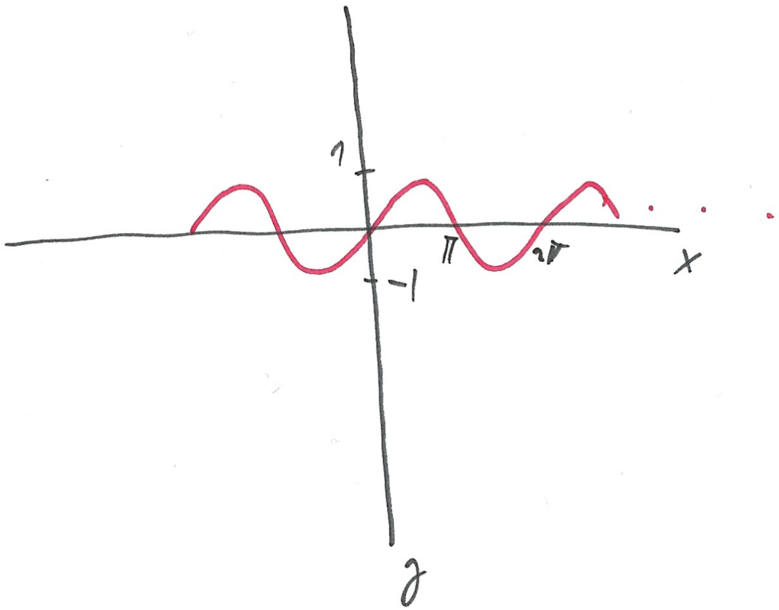
$$\frac{(x-1)\cdot(\cancel{x+2})}{(\cancel{x+2})}$$



LIMITA V NEVLASTNOM BODE







$$\lim_{n\to\infty} \frac{n-1}{n+3} = \lim_{n\to\infty} \frac{\cancel{n}(1-\frac{1}{n})}{\cancel{n}(1+\frac{3}{n})} = \frac{1-0}{1+0} = 1$$

$$\lim_{n\to\infty} \sqrt[n]{2} = 1$$

$$2^{\frac{1}{n}} \quad 2, \sqrt{2}, \sqrt[3]{2}, \sqrt[4]{2}, \sqrt[5]{2}, \ldots$$

$$\lim_{n\to\infty} \sqrt[n]{2+\frac{1}{n}} = 1$$

$2 + 0$

$$\lim_{n\to\infty} \frac{1}{n} = 0$$

$$\lim_{n\to\infty} \frac{7}{n} = \lim_{n\to\infty} \underset{\downarrow\,7}{7} \cdot \underset{\downarrow\,0}{\frac{1}{n}} = 0$$

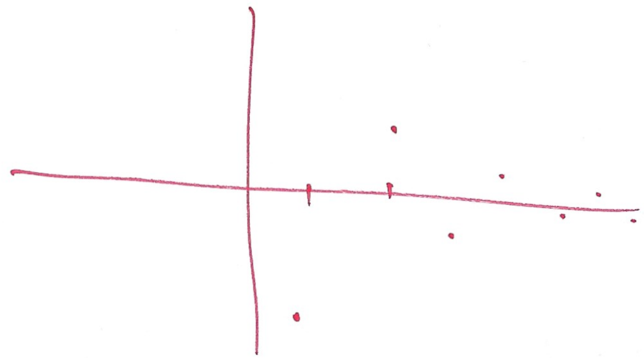
$$\lim_{n\to\infty} 7 = 7$$

$$\lim_{n\to\infty} \frac{1}{n} = 0$$

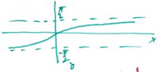
$$\lim_{n\to\infty} \left(\underset{\downarrow\,0}{\frac{1}{n}} + \underset{\downarrow\,4}{4}\right) = 0+4 = 4$$

$$\lim_{n\to\infty} \left(\frac{2}{n} - 3\right) = \lim_{n\to\infty} \left(\underset{\downarrow\,0}{\frac{2}{n}} + \underset{\downarrow\,-3}{(-3)}\right) = -3$$

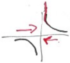
$$\frac{7\cdot(-1)^n}{n} = 7\cdot(-1)^n \cdot \frac{1}{n} \to 0$$



$$\lim_{x\to\infty} \operatorname{arctg} x = \frac{\pi}{2}$$



$$\lim_{x\to\infty} \frac{1}{x} = 0$$

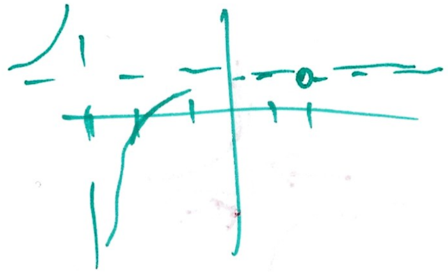


$$\lim_{x\to\infty} \boxed{\operatorname{arctg} \underbrace{\frac{1}{x}}_{\to 0}} = 0$$

$$\lim_{x\to 0^-} \operatorname{arctg}\Big(\underbrace{\frac{1}{x}}_{\to -\infty}\Big) = -\frac{\pi}{2}$$

$$\lim_{x\to 0^+} \operatorname{arctg}\Big(\underbrace{\frac{1}{x}}_{\to \infty}\Big) = \frac{\pi}{2}$$

$$\lim_{x \to 2} \frac{x^2-4}{(x-2)(x+3)} = "\frac{0}{0}" = \lim_{x \to 2} \frac{\cancel{(x-2)}(x+2)}{\cancel{(x-2)}(x+3)} = \lim_{x \to 2} \frac{x+2}{x+3} = \frac{4}{5}$$



$$\lim_{x \to -1} \frac{\sqrt{x+2} - 1}{x+1} = "\frac{0}{0}" = \lim_{x \to -1} \frac{\sqrt{x+2}-1}{x+1} \cdot \frac{\sqrt{x+2}+1}{\sqrt{x+2}+1} = \lim_{x \to -1} \frac{x+2-1}{(x+1)(\sqrt{x+2}+1)} = \lim_{x \to -1} \frac{\cancel{x+1}}{\cancel{(x+1)}(\sqrt{x+2}+1)}$$

$$= \lim_{x \to -1} \frac{1}{\sqrt{x+2}+1} = \frac{1}{2}$$

$$\lim_{n\to\infty} \frac{\sqrt{n^2+4}}{n+3} = \lim_{n\to\infty} \frac{\sqrt{n^2\left(1+\frac{4}{n^2}\right)}}{n\left(1+\frac{3}{n}\right)} = \lim_{n\to\infty} \frac{\cancel{n}\sqrt{\underbrace{1+\frac{4}{n^2}}_{\to 1+0}}}{\cancel{n}\left(\underbrace{1+\frac{2}{n}}_{1+0}\right)} = \frac{\sqrt{1+0}}{1+0} = 1$$

$$\boxed{\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n = e}$$

$$a^{n\cdot m} = \left(a^n\right)^m = \left(a^m\right)^n$$

$$\lim_{n\to\infty}\left(\underbrace{1+\frac{1}{n}}_{\to 1+0=1}\right)^3 = 1^3 = 1$$

$$\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^{3n} = \lim_{n\to\infty}\left[\underbrace{\left(1+\frac{1}{n}\right)^n}_{\to e}\right]^3 = e^3$$

$$\lim_{n\to\infty}\left(1-\frac{1}{n}\right)^{n} = \lim_{n\to\infty}\left(\frac{n-1}{n}\right)^{n-1}\cdot\left(\frac{n-1}{n}\right)^{1}$$

$$\left(\frac{n-1}{n}\right)^{n-1}\cdot\underbrace{\boxed{\left(1-\frac{1}{n}\right)^{1}}}_{\to 1}$$

$$\left(1+\frac{1}{n}\right)^{n} = \left(\frac{n+1}{n}\right)^{n}$$

$$\left(1-\frac{1}{n}\right)^{n} = \left(\frac{n-1}{n}\right)^{n}$$

$$\left(\frac{n}{n-1}\right)^{n-1} = \left(\frac{n-1+1}{n-1}\right)^{n-1} = \left(1+\frac{1}{n-1}\right)^{n-1}$$

$$\lim_{n\to\infty}\left(\frac{n-1}{n}\right)^{n-1} = \lim_{n\to\infty}\frac{1}{\left(\frac{n}{n-1}\right)^{n-1}} = \lim_{n\to\infty}\frac{1}{\left(\frac{n-1+1}{n-1}\right)^{n-1}} = \lim_{n\to\infty}\boxed{\frac{1}{\left(1+\frac{1}{\underset{\to\infty}{n-1}}\right)^{\underset{\to\infty}{n-1}}}} \to e$$

$$= \frac{1}{e}$$

$$\left(\frac{1}{2}\right)^2 = \frac{}{\left(\frac{2}{1}\right)^2}$$

$$\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^{n} = e$$