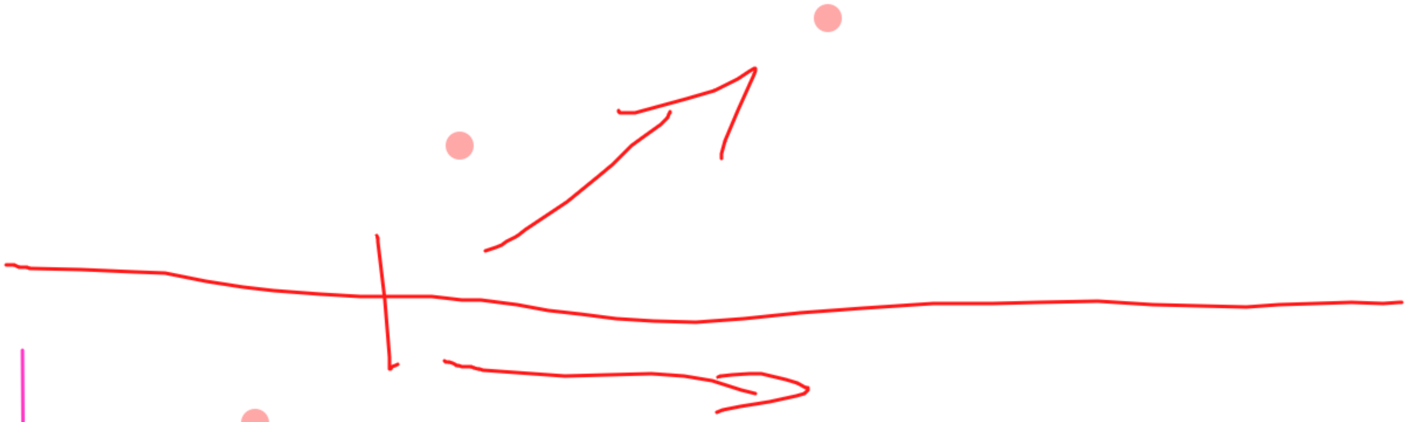
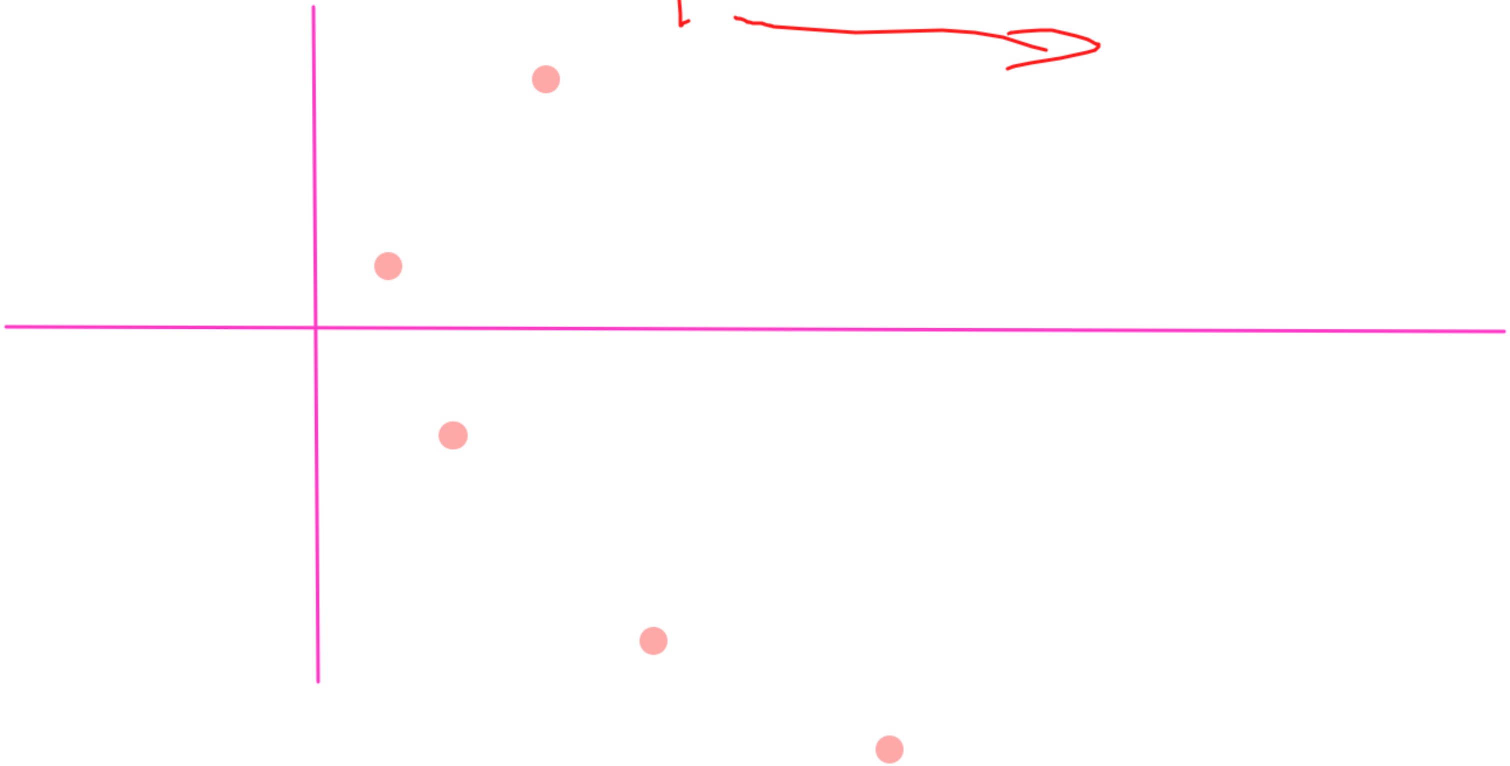
$$\lim \frac{\sin(n!)}{n}$$

$$0 \leftarrow -\frac{1}{n} \leq \frac{\sin(n!)}{n} \leq \frac{1}{n} \longrightarrow 0$$

$$\lim \frac{n!}{\sin(n!)}$$





$$\lim \frac{5 \cdot 2^n + n^8}{5^n + 10n^2} = \lim \frac{2^n}{5^n} \cdot \frac{5 + \frac{n^8}{2^n}}{1 + 10\frac{n^2}{5^n}}$$

$\frac{2^n}{5^n} \to 0$, $\frac{n^8}{2^n} \to 0$, $\frac{n^2}{5^n} \to 0$

$= 0$

$$1 < \lim n \qquad 1 = \lim \frac{n}{n} = \lim n \cdot 0 = \lim 0 = 0$$

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

$$\lim n\left(\frac{\sqrt{1+\frac{1}{n}}-\sqrt{1-\frac{1}{n}}}{1}\cdot\frac{\sqrt{1+\frac{1}{n}}+\sqrt{1-\frac{1}{n}}}{\sqrt{1+\frac{1}{n}}+\sqrt{1-\frac{1}{n}}}\right) =$$

$$= \lim n\,\frac{\overbrace{\left(1+\frac{1}{n}\right)-\left(1-\frac{1}{n}\right)}}{\sqrt{1+\underset{\uparrow\,0}{\frac{1}{n}}}+\sqrt{1-\underset{\uparrow\,0}{\frac{1}{n}}}} = \lim_{n\to\infty} \cancel{n}\cdot\frac{\frac{2}{\cancel{n}}}{\sqrt{}+\sqrt{}} = \lim_{n\to\infty}\frac{2}{2} = \boxed{1}$$

$$\lim \frac{\log_2(n)}{n} = \lim \frac{\frac{\log_n n}{\log_n 2}}{n} = \lim \frac{1}{n \log_n 2}$$

$$\log_n 2 = \frac{\ln(2)}{\ln(n)} \longrightarrow 0$$

$$n = 2^k \qquad n \to \infty \iff k \to \infty$$

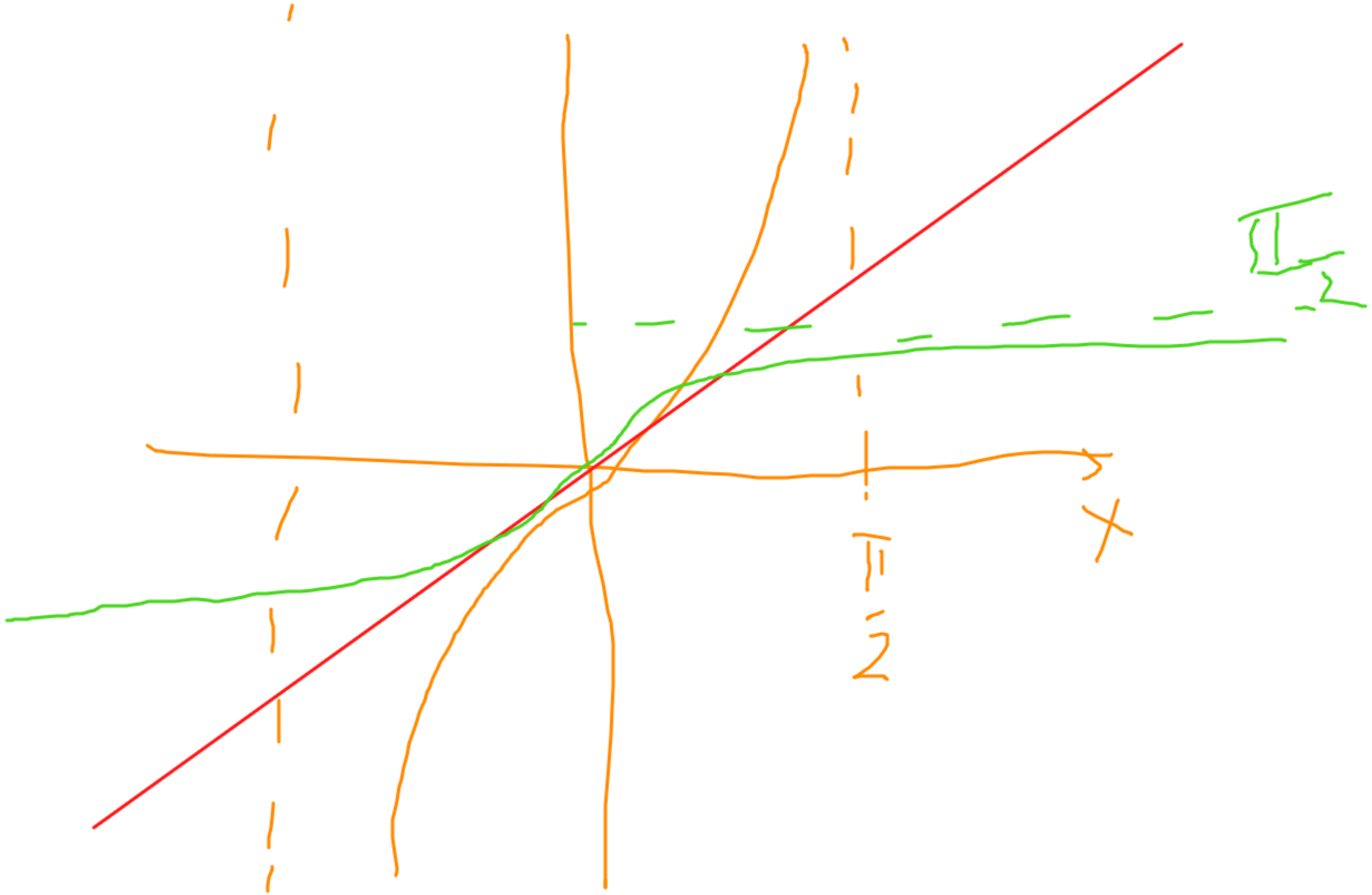
$$\lim \frac{\log_2(2^k)}{2^k} = \lim \frac{k}{2^k}$$

$$\lim \sqrt[n]{n} = \lim e^{\frac{1}{n}\ln(n)} = e^{\lim \frac{\ln(n)}{n}} = e^{0} = 1$$

$$\lim \frac{\sqrt[4]{16-\frac{1}{n}}-2}{\sqrt{16-\frac{1}{n}}-4} = \lim_{n\to\infty} \frac{\left(16-\frac{1}{n}\right)-4}{(\quad)\left(\sqrt[4]{16-\frac{1}{n}}+2\right)} =$$

$$\lim \frac{\sqrt[4]{16-\frac{1}{n}}-2}{\boxed{\sqrt{16-\frac{1}{n}}}-4} = \lim_{n\to\infty} \frac{\left(16-\frac{1}{m}\right)-4}{(\quad)} = \frac{\frac{\sqrt[4]{a}}{\sqrt{a}} - \frac{2}{\sqrt{a}}}{\frac{\sqrt{a}}{\sqrt{a}} - \frac{4}{\sqrt{a}}}$$

$$\frac{\cancel{\sqrt[4]{16-\frac{1}{n}}-2}}{\left(\sqrt[4]{16-\frac{1}{n}}+2\right)\left(\cancel{\sqrt[4]{16-\frac{1}{n}}-2}\right)} = \frac{1}{2+2} = 1/4$$


x
$\frac{\pi}{2}$
$\frac{\pi}{2}$

$$\frac{dN}{dt} = +RN$$

$$\frac{de^a}{da} = e^a$$

SIR

$$N = S + I + R$$

$$\frac{dS}{dt} = -RIS$$

$$\frac{dI}{dt} = +RIS - \alpha I$$

$$\frac{dR}{dt} = +\alpha I$$