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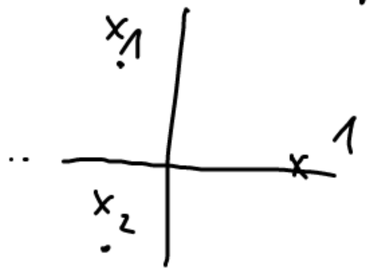
c) $\prod_{n=1}^{\infty}\left(1+\frac{z^2}{n^2}+\frac{z^4}{n^4}\right)=\prod_{n=1}^{\infty} f\left(\frac{z^2}{n^2}\right)=\prod_{n=1}^{\infty}\left(\frac{z^2}{n^2}-x_1\right)\left(\frac{z^2}{n^2}-x_2\right)=$

$f(x)=1+x+x^2=(x-x_1)(x-x_2)=\left(\frac{x}{x_1}-1\right)\left(\frac{x}{x_2}-1\right)\underbrace{x_1x_2}_{1}=\left(1-\frac{x}{x_1}\right)\left(1-\frac{x}{x_2}\right)$

$f(x)\cdot(x-1)=x^3-1$

$\Delta=1-4=-3$

$x_{1,2}=\frac{-1\pm\sqrt{3}i}{2}$



$\frac{1}{x_1}=x_2=x_1^2$

$=\prod_{n=1}^{\infty}\left(1-\frac{\frac{z^2}{n^2}}{x_1}\right)\left(1-\frac{\frac{z^2}{n^2}}{x_2}\right)=\prod_{n=1}^{\infty}\left(1-\left(\frac{x_1z}{n}\right)^2\right)\left(1-\left(\frac{x_2z}{n}\right)^2\right)=$

$=\frac{\sin\pi x_1z}{\pi x_1z}\;\frac{\sin\pi x_2z}{\pi x_2z}$