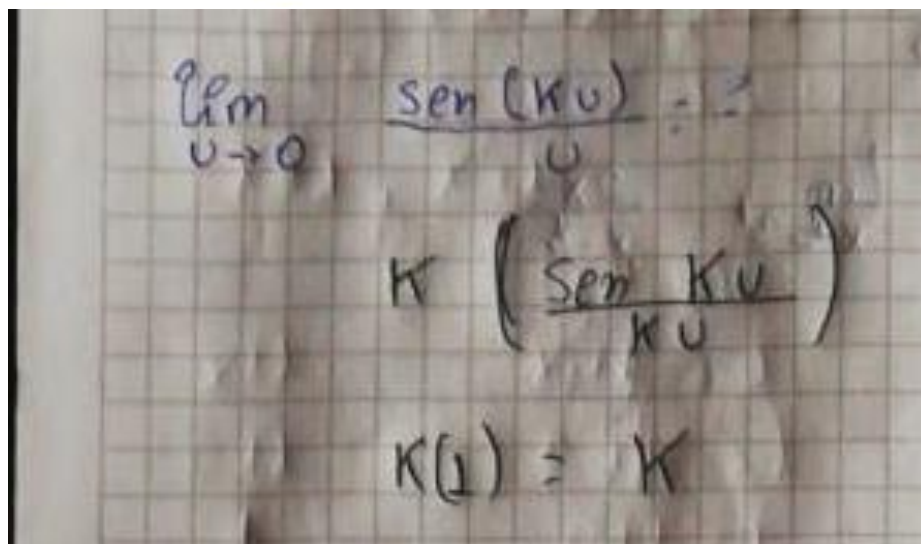


$$\lim_{u \rightarrow 0} \frac{\text{sen}(ku)}{u} = ?,$$



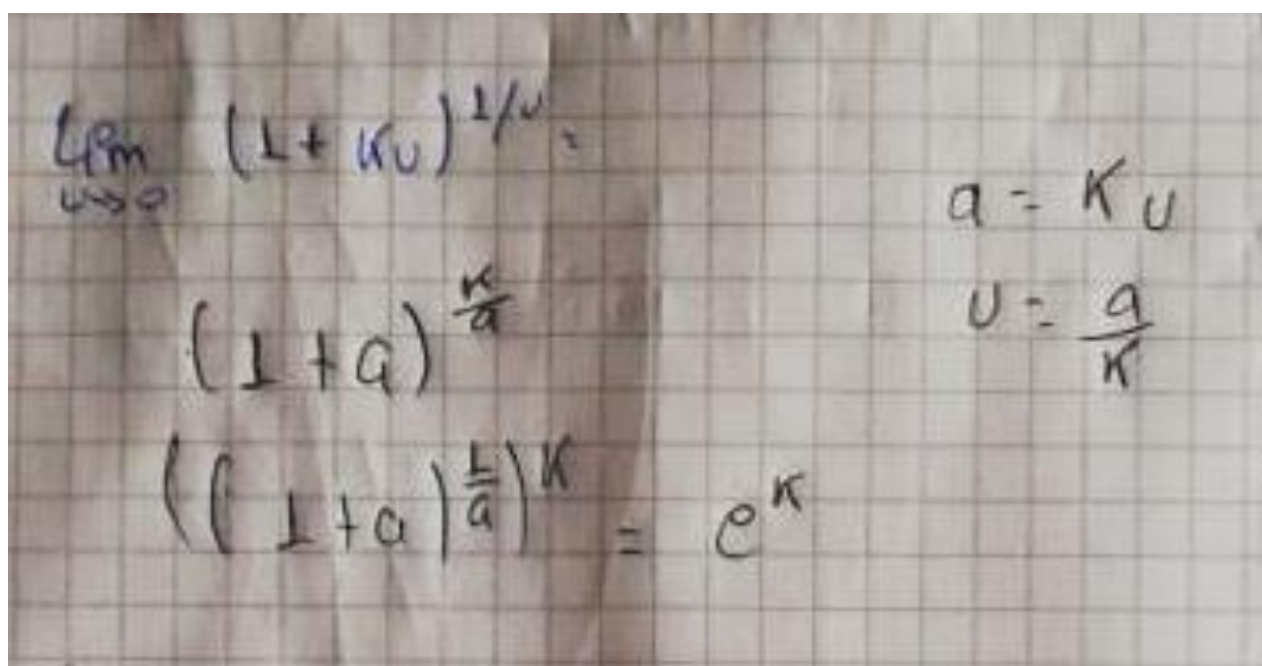
Handwritten solution on grid paper:

$$\lim_{u \rightarrow 0} \frac{\text{sen}(ku)}{u} = ?$$

$$K \left(\frac{\text{sen } Ku}{Ku} \right)$$

$$K(1) = K$$

$$\lim_{u \rightarrow 0} (1 + ku)^{1/u} = ?$$



Handwritten solution on grid paper:

$$\lim_{u \rightarrow 0} (1 + ku)^{1/u} =$$

$$(1 + a)^{\frac{K}{a}}$$

$$\left(\left(1 + a \right)^{\frac{1}{a}} \right)^K = e^K$$

Substitutions:

$$a = Ku$$

$$u = \frac{a}{K}$$

$$\lim_{u \rightarrow \infty} \left(1 + \frac{k}{u}\right)^u = ?$$

$$\begin{aligned} \lim_{u \rightarrow \infty} \left(1 + \frac{k}{u}\right)^u &= ? \\ \lim_{u \rightarrow \infty} \left(1 + \frac{k}{u}\right)^u &= \lim_{u \rightarrow \infty} \left(1 + \frac{1}{\frac{u}{k}}\right)^{\frac{u}{k} \cdot k} \\ &= \lim_{u \rightarrow \infty} \left(1 + \frac{1}{\frac{u}{k}}\right)^{\frac{u}{k}}^k = e^k \end{aligned}$$

$$\lim_{u \rightarrow 0} \frac{1 - \cos(ku)}{u} = ?$$

$$\lim_{u \rightarrow 0} \frac{1 - \cos(ku)}{u} = ?$$

$$\frac{1 - \cos ku}{u} \times \frac{1 + \cos ku}{1 + \cos ku} = \frac{(1)^2 - (\cos ku)^2}{u(1 + \cos ku)}$$

$$\frac{1 - \cos^2 ku}{u(1 + \cos ku)} = \frac{\sin^2 ku}{u(1 + \cos ku)}$$

$$\frac{\sin ku}{u} \times \frac{\sin ku}{1 + \cos ku}$$

$$k \times \frac{0}{1+1} = k \times \frac{0}{2} = k \times 0 = 0$$

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- **Cristian Alexander Santos nazareno**
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