Função Exponencial Múltipla

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$$\left(\frac{1}{e}\right)^{\left(\frac{1}{e}\right)} = e^{-e^{-1}} = \frac{1}{\sqrt[e]{e}}$$

$$\sqrt[e]{e} = e^{e^{-1}}$$

$$\sqrt[\sqrt[e]{e}]{e} = e^{e^{-e^{-1}}}$$

$$\sqrt[\sqrt[\sqrt[e]{e}]{e}]{e} = e^{e^{-e^{-e^{-e^{-1}}}}}$$

$$f_n(x) = x^{x^{\cdot^{\cdot^{\cdot^{x}}}}}$$

$$f_n\left(\tfrac{1}{x}\right) = x^{-x^{-x^{\cdot^{\cdot^{\cdot^{-x^{-1}}}}}}}$$

$$r_n(x) = \sqrt[\sqrt[\sqrt[x]{x}]{\sqrt[x]{x}}]{x} = x^{x^{-x^{-x^{\cdot^{\cdot^{\cdot^{-x^{-1}}}}}}}} = x^{f_{n-1}\left(\frac{1}{x}\right)}$$

Seja

$$f_n(x) = x^{x^{\cdot^{\cdot^{\cdot^{x}}}}} \quad (n-1) \text{ vezes}$$

e

$$r_n(x) = \sqrt[\sqrt[\sqrt[x]{x}]{\sqrt[x]{x}}]{x} \quad (n-1) \text{ vezes}$$

Então

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