(107)

$$\lim_{x\to 2} \frac{\log(3^x + x - 11)}{\log \operatorname{sen} \pi x} =$$

$$= \lim_{x\to 2} \frac{\log(3^x + x - 2 - 9)}{\log \operatorname{sen} \pi x} =$$

$$= \lim_{x\to 2} \frac{\log(3^x - 3^2 + x - 2)}{\log \operatorname{sen} \pi x} =$$

$$= \lim_{x\to 2} \frac{\log\left[3^2(3^{x-2} - 1) + x - 2\right]}{\log \operatorname{sen} \pi x} =$$

$y = x - 2 \qquad x = y + 2 \qquad x \to 2 \Rightarrow y \to 0$

$$\lim_{y \to 0} \frac{\log\left[3^2(3^y - 1) + y\right]}{\log \operatorname{sen} \pi (y+2)} =$$

$$= \lim_{y \to 0} \frac{\log\left[y\left[3^2 \frac{3^y - 1}{y} + 1\right]\right]}{\log \operatorname{sen}(\pi y + 2\pi)} =$$

$$= \lim_{y \to 0} \frac{\log y + \log\left[3^2 \cdot \frac{3^y - 1}{y} + 1\right]}{\log \operatorname{sen} \pi y} =$$

$$= \lim_{y \to 0} \frac{\log y + \log\left[3^2 \frac{3^y - 1}{y} + 1\right]}{\log \frac{\operatorname{sen} \pi y}{\pi y} + \log \pi + \log y} =$$

$$= \lim_{y \to 0} \frac{1 + \log\left[3^2 \cdot \frac{3^y - 1}{y} + 1\right]}{1 + \frac{\log \frac{\operatorname{sen} \pi y}{\pi y}}{\log y} + \frac{\log \pi}{\log y}} = 1$$