

$$\textcircled{5} \quad \frac{e^x - \cos x - x}{x - \ln(1+x)} = f(x)$$

$$x - \ln(1+x) = x - \left(x - \frac{x^2}{2} + o(x^2)\right) = \frac{x^2}{2} + o(x^2)$$

$$\begin{aligned} e^x - \cos x - x &= 1 + x + \frac{x^2}{2} + o(x^2) - \left(1 - \frac{x^2}{2} + o(x^2)\right) - x \\ &= \frac{x^2}{2} + \frac{x^2}{2} + o(x^2) = x^2 + o(x^2) \end{aligned}$$

$$f(x) = \frac{x^2 + o(x^2)}{\frac{x^2}{2} + o(x^2)} = \frac{x^2(1+o(1))}{x^2(\frac{1}{2}+o(1))} \xrightarrow{x \rightarrow 0} \frac{1}{\frac{1}{2}} = 2$$