$$\lim_{w\to 7} 4e^{1/(w-6)} = st\left(4e^{1/((7+\varepsilon)-6)}\right) \overset{10/7/10}{=}$$

$0 \neq \varepsilon \approx 0$

$$st\left(4e^{1/(1-\varepsilon)}\right) = 4st\left(e^{1/(1-\varepsilon)}\right) = 4e^{st(1/(1-\varepsilon))}$$

$$= 4e^{1/(1-0)} = 4e^1 = \boxed{4e}$$

Check: $4e^{1/(6.9998-6)} = 10.891493899602\ldots$

$4e = 10.873127313\ldots$

$$\left(e^{-x^{16}/16}\right)' = e^{-x^{16}/16}\left(-x^{16}/16\right)' = e^{-x^{16}/16}\left(-16x^{16-1}/16\right) = e^{-x^{16}/16}\left(-x^{15}\right)$$

$$\left(e^{-x^{16}/16}\right)'' = \left(e^{-x^{16}/16}\left(-x^{15}\right)\right)' = \left(e^{-x^{16}/16}\right)'\left(-x^{15}\right) + \left(e^{-x^{16}/16}\right)\left(-x^{15}\right)'$$

$$\lim_{x\to 0^+} \frac{x+1}{\ln x} = st\left(\frac{0+\varepsilon+1}{\ln(0+\varepsilon)}\right) = st\left(\frac{\varepsilon+1}{\ln\varepsilon}\right) = st\left(\frac{\text{infinitely small}+1}{\text{infinitely big}}\right) =$$

$0 < \varepsilon \approx 0$

$st\left(\frac{\text{infinitely small}}{\text{infinitesimal}}\right)$ Try $\frac{0+1}{\ln 0}$ ← $\ln 0$ not defined

try $\frac{st(\varepsilon+1)}{st(\ln\varepsilon)}$ ← does not exist b/c $\ln\varepsilon$ is infinite

$\varepsilon+1$ is finite, non infinitesimal

medium

$\ln\varepsilon$ is infinite ("big")

$\frac{\text{medium}}{\text{big}}$ is "small"

$\frac{\text{small}}{\text{big}}$ is small

infinite · infinite = infinite

big · big = big

Section 1.5 & 1.6, 3.3

Eg. Small could be small, medium small or big, use an algebra trick...

$\frac{\sqrt{\varepsilon}}{\varepsilon} = \frac{1}{\sqrt{\varepsilon}}$ is $\frac{1}{\text{small}}$ is "big", i.e., infinite

$$\lim_{w\to 6^-} 2e^{1/(w-6)} = st\left(2e^{1/(6-\varepsilon-6)}\right) = 2st\left(e^{1/(-\varepsilon)}\right) = 2\cdot 0 = \boxed{0}$$

$w \to 6^-$

$0 < \varepsilon \approx 0$

↳ try $2e^{st(1/(-\varepsilon))}$ does not exist b/c $\frac{1}{\varepsilon}$ is infinite & negative

Try $w = 5.9$

See if that makes $2e^{1/(w-6)}$ close to 0 : 0.000090...

$$\lim_{w \to 6^+} 2e^{1/(w-6)} = \text{St}\left(2e^{1/(6+\varepsilon-6)}\right) = 2\,\text{St}\left(e^{1/\varepsilon}\right)$$

$0 < \varepsilon \approx 0$

$1/\varepsilon$ infinite & positive $\to e^{1/\varepsilon}$ infinite positive

$\to 2e^{1/\varepsilon}$ infinite & positive

$\lim_{w \to 6^+} 2e^{1/(w-6)}$ does not exist