$\varepsilon + 1$ = finite non-infinitesimal

$\ln \varepsilon$ is infinitely big

$\frac{\text{finite}}{\text{infinite}}$ = "small" infinitesimal

$\frac{7}{1000000}$ = "small"

$\frac{\text{small}}{\text{big}}$ = "small"

big · big = "big"

$\boxed{\text{Sec } 1.5}$ + $\boxed{\text{Sec } 3.3}$

* small could be small - small, medium or big

note to use an algebra trick

$$\frac{\sqrt{\varepsilon}}{\varepsilon} = \text{rewrite it} \ldots = \frac{1}{\sqrt{\varepsilon}} = \frac{1}{\text{"small"}} \approx \text{"big" eg "infinite"}$$

Another limit:

infinitely close to 6 but neg

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

pull out the real #

$$= 2\, st\left(e^{1/(-\varepsilon)}\right)$$

try ...

$$= 2e\, st\left(^{1(1/-\varepsilon)}\right)$$

won't work because $\boxed{1/-\varepsilon}$ is infinite its Reciprocal will be infinitely big.

$$= 2\, st(0)$$

$$e^{(-1+)} \approx 0$$

$$= 2 \cdot 0$$

$$= e^{(1/-\varepsilon))} \text{ is infinitely small}$$

$$= 0$$

$$= 2 \cdot 0 = 0$$

Sanity check

$w = 5.9999$

$$2e^{1/5.9999-6} = .0000090$$

10/7/10 Calculus I

Handout

St parts For exponentials & logarithms

$$\lim_{\omega \to 7} st(4e^{1/(7+\varepsilon)-6)})$$

non-zero infinitesimal

$$= st(\underset{\text{real \#}}{4e}^{\,1/(1-\varepsilon)}$$

$$= 4\,st(e^{(1/1-\varepsilon)})$$ rule in Handout

$$= 4e^{st(1/(1-\varepsilon))}$$
$$\quad 1/(1-0)$$

$$= 4e$$

$$= 4e^{1}$$

$$= 4e$$

check: Something close to ω....

~~7.001~~ (6.998 close to 7)

$$4e^{(1/6.998)-6)} = 10.8949389962\ldots$$

$$4e = 10.87312731 38\ldots$$

they match

even closer to 7...

$$4e^{(1/6.9998)-6)} =$$

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

$0 < \varepsilon \approx 0$

$$= st\left(\frac{\text{infinitely small}+1}{\text{infinitely Big \& neg}}\right) = st(\text{infinitely small}) = st(0) = 0$$

infinitesimal

or try $\frac{0+1}{\ln 0}$ ← cannot be defined

or try $\frac{st(\varepsilon+1)}{st(\ln\varepsilon)}$ does not exist because log is infinitely big