

1.1.5

3MS

$$2) \lim_{x \rightarrow 2} \frac{e^x - e^2}{x - 2} = \ll \frac{e^2 - e^2}{2 - 2} \gg = \ll \frac{0}{0} \gg$$

Le calcul direct conduit à une indétermination.

$$\text{B.-H. donne: } \lim_{x \rightarrow 2} \frac{e^x - 0}{1 - 0} = \lim_{x \rightarrow 2} e^x$$

$$= e^2 = \lim_{x \rightarrow 2} \frac{e^x - e^2}{x - 2}$$

$$b) \lim_{x \rightarrow 0} \frac{e^x - 1}{\sin(x)} = \ll \frac{e^0 - 1}{0} \gg = \ll \frac{0}{0} \gg \text{ IND}$$

$$\lim_{x \rightarrow 0} \frac{(e^x - 1)'}{(\sin(x))'} = \lim_{x \rightarrow 0} \frac{e^x - 0}{\cos(x)} = \lim_{x \rightarrow 0} \frac{e^x}{\cos(x)}$$

$$= \ll \frac{e^0}{\cos(0)} \gg = \ll \frac{1}{1} \gg = 1 = \lim_{x \rightarrow 0} \frac{e^x - 1}{\sin(x)} \quad \text{B.-H.}$$

1.1.5

3MS

$$c) \lim_{x \rightarrow 0} \frac{x \cdot e^x}{1 - e^x} = \ll \frac{0 \cdot e^0}{1 - e^0} \gg = \ll \frac{0}{0} \gg \text{IND}$$

$$\begin{aligned} \lim_{x \rightarrow 0} \frac{(x \cdot e^x)'}{(1 - e^x)'} &= \lim_{x \rightarrow 0} \frac{x'e^x + x(e^x)'}{0 - e^x} \\ &= \lim_{x \rightarrow 0} \frac{e^x + x e^x}{-e^x} = \ll \frac{e^0 + 0 \cdot e^0}{-e^0} \gg \end{aligned}$$

$$= \ll \frac{1+0}{-1} \gg = \ll \frac{1}{-1} \gg = -1$$

B.-H.

$$\Rightarrow \lim_{x \rightarrow 0} \frac{x \cdot e^x}{1 - e^x} = -1$$

1.1.5

3MS

IND

$$d) \lim_{\substack{x \rightarrow 0 \\ >}} x \cdot e^{1/x} = \ll 0 \cdot e^{+\infty} \gg = \ll 0 \cdot \infty \gg$$

$$\lim_{\substack{x \rightarrow 0 \\ >}} x \cdot e^{1/x} = \lim_{\substack{x \rightarrow 0 \\ >}} \frac{e^{1/x}}{1/x} \quad \text{On dérive } \begin{cases} \nearrow \text{en haut} \\ \searrow \text{en bas} \end{cases}$$

$$\lim_{\substack{x \rightarrow 0 \\ >}} \frac{(e^{1/x})'}{(1/x)'} = \lim_{\substack{x \rightarrow 0 \\ >}} \frac{e^{1/x} \cdot (1/x)'}{(1/x)'}$$

$$= \lim_{\substack{x \rightarrow 0 \\ >}} e^{1/x} = \ll e^{+\infty} \gg = +\infty$$

$$\Rightarrow \lim_{\substack{x \rightarrow 0 \\ >}} x \cdot e^{1/x} = +\infty$$

B.-H.