## Exponential and logarithmic functions: case $k>1$

$f: \mathbb{R} \rightarrow] 0,+\infty\left[, f(x)=k^{x}\right.$ increasing, continuous

$$
\begin{aligned}
& \lim _{x \rightarrow-\infty} k^{x}=0^{+} \\
& \lim _{x \rightarrow+\infty} k^{x}=+\infty
\end{aligned}
$$

$g:] 0,+\infty\left[\rightarrow \mathbb{R}, g(x)=\log _{k} x\right.$
increasing, continuous
$\lim _{x \rightarrow 0^{+}} \log _{k} x=-\infty$
$\lim _{x \rightarrow+\infty} \log _{k} x=+\infty$


## Exponential and logarithmic functions: case $0<k<1$

$$
\begin{array}{rr}
f: \mathbb{R} \rightarrow] 0,+\infty\left[, f(x)=k^{x}\right. & g:] 0,+\infty\left[\rightarrow \mathbb{R}, g(x)=\log _{k} x\right. \\
\text { decreasing, continuous } & \text { decreasing, continuous } \\
\lim _{x \rightarrow-\infty} k^{x}=+\infty & \lim _{x \rightarrow 0^{+}} \log _{k} x=+\infty \\
\lim _{x \rightarrow+\infty} k^{x}=0^{+} & \lim _{x \rightarrow+\infty} \log _{k} x=-\infty
\end{array}
$$

