Q1. Evaluate the limits

*i.* $\displaystyle\lim_{x\to 0}\frac{x}{\tan^{-1}(2x)}$

*ii.* $\displaystyle\lim_{x\to\infty}(x^2+1)^{\frac{1}{\ln x}}$
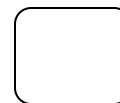
Q2. Sketch a graph of a function that satisfies the given conditions.

$\begin{cases} f(x) \text{ is continuous on } (-\infty,\infty) \\ f'(x)<0 \text{ on } (-\infty,2) \\ f'(x)>0 \text{ on } (2,\infty) \\ f''(x)<0 \text{ on } (-\infty,2) \text{ and } (2,\infty) \end{cases}$