Introduction to L'Hôpital's Rule

In this final unit we tie up some loose ends related to calculus and limits. Our first topic is L'Hôpital's rule, which is useful for understanding multiplication and division by infinity.

L'Hôpital's rule is also known as L'Hospital's rule; the circumflex accent indicates that the letter S has been omitted, so the two spellings are equivalent. The two spellings are pronounced identically, with a long O and silent S.

L'Hôpital's rule is used to calculate limits of expressions like:

$$\begin{aligned} x \ln x \qquad & \text{as } x \to 0^+, \\ xe^{-x} \qquad & \text{as } x \to \infty, \\ \frac{\ln x}{x} \qquad & \text{as } x \to \infty. \end{aligned}$$

We could use a calculator to guess what these limits are, but L'Hôpital's rule gives us a systematic and provable way of finding the limits.

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