8.7 Indeterminate forms and L'Hôpital's Rule

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L'Hôpital's Rule:

f and g are diff'ble on (a,b)
except possibly at c

g'(x)≠0 for all x in (a,b)
except possibly at c

$\lim_{x \to c} \frac{f(x)}{g(x)}$ is an indeterminate form
(0/0, ∞/∞, etc.)

$$\lim_{x \to c} \frac{f(x)}{g(x)} = \lim_{x \to c} \frac{f'(x)}{g'(x)}$$

ex. $\lim_{x \to 0} \frac{\sin 3x}{x}$

ex $\lim_{x \to 0} \frac{e^{2x} - 1}{x}$

ex $\lim_{x\to\infty} \frac{\ln x}{x}$

ex. $\lim_{x\to -\infty} \frac{x^2}{e^{-x}}$

ex. $\lim_{x \to \infty} e^{-x}\sqrt{x}$

ex. $\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^{x}$

ex. $\lim_{x \to 0+} \left(\sin x\right)^{x}$