8.3 Relative Rates of Growth

Definitions: Faster, Slower, Same-rate Growth

if $\quad \displaystyle\lim_{x \to \infty} \frac{f(x)}{g(x)} = \infty$

$\displaystyle\lim_{x \to \infty} \frac{f(x)}{g(x)} = 0$

$\displaystyle\lim_{x \to \infty} \frac{f(x)}{g(x)} = L \qquad 0 < L < \infty$

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Which function grows faster?

$e^x \qquad x^2$

$\ln x \quad x \quad x^2$

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Show the functions grow at the same rate:

$x,\ x + \sin x$

$\log_a x,\ \log_b x$

Transitivity of Growing Rates:

Show the functions grow at the same rate by comparing both with x

$$\sqrt{x^2 + 5} \qquad \left(2\sqrt{x} - 1\right)^2$$