

## Interesting limit:

$$\lim_{x \rightarrow \infty} \frac{(2x+1)^x}{x^{x+1}}$$

$$= \lim_{x \rightarrow \infty} \left( \frac{2x+1}{x^{1+1/x}} \right)^x$$

$$\ln y = \ln \lim_{x \rightarrow \infty} \left( \frac{2x+1}{x^{1+1/x}} \right)^x$$

$$\ln y = \lim_{x \rightarrow \infty} \ln \left( \frac{2x+1}{x^{1+1/x}} \right)^x$$

$$\ln y = \lim_{x \rightarrow \infty} x \ln \left( \frac{2x+1}{x^{1+1/x}} \right)$$

$$\ln y = \lim_{x \rightarrow \infty} x \ln \left( \frac{2}{x^{1/x} + 1} + \frac{1}{x^{1+1/x}} \right)$$

$$\ln y = \lim_{x \rightarrow \infty} x \ln 2$$

$$\therefore \lim_{x \rightarrow \infty} \frac{(2x+1)^x}{x^{x+1}} = \infty$$

$$\lim_{x \rightarrow \infty} x^{1/x} = 1$$