

Evaluate the following limits:

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

2. $\lim_{x \rightarrow \infty} x^{\frac{1}{x}}$

3. $\lim_{x \rightarrow 0} x^x$

4. $\lim_{x \rightarrow 0} -x^x + x^{x^x}$

5. $\lim_{x \rightarrow 0} \frac{x^2 \sin(\frac{1}{x}) + x}{(1+x)^{\frac{1}{x}} - e}$