

$$\lim_{n \rightarrow \infty} \frac{n^3 e^n + 3}{2^n - (n+1)^3 e^n} = \frac{e^n \cdot (n^3 + \frac{3}{e^n})}{e^n \cdot ((n+1)^3 - 2^n \cdot \frac{1}{e^n})} = n^3 \cdot (1 + \frac{3}{n^3 e^n})$$

$$\lim_{n \rightarrow \infty} \frac{n^3 e^n + 3}{2^n - (n+1)^3 e^n} = \frac{e^n \cdot (n^3 + 3 \cdot \frac{1}{e^n})}{e^n \cdot ((n+1)^3 - 2^n \cdot \frac{1}{e^n})} = \frac{n^3 (1 + 3 \cdot \frac{1}{e^n} \cdot \frac{1}{n^3})}{n^3 + 3n^2 + 3n + 1 - 2^n \cdot \frac{1}{e^n}} = \frac{n^3 (1 + 3 \cdot \frac{1}{e^n} \cdot \frac{1}{n^3})}{n^3 (1 + \frac{3}{n} + \frac{3}{n^2} + \frac{1}{n^3} - 2^n \cdot \frac{1}{e^n} \cdot \frac{1}{n^3})} =$$

$$\frac{1}{1 - 2^n \cdot 0} = \frac{1}{-\infty \cdot 0} \cdot 2$$