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

$$\lim_{n\to\infty} \frac{n^3e^n+3}{2^n-(n+1)^3e^n} = \frac{e^n\cdot\left(n^3+3\cdot\frac{1}{e^n}\right)}{e^n\cdot\left((n+1)^3-2^n\cdot\frac{1}{e^n}\right)} = \frac{n^3\left(1+3\cdot\frac{1}{e^n}\cdot\frac{1}{n^3}\right)}{n^3+3n^2+3n+1-2^n\cdot\frac{1}{e^n}} = \frac{n^3\cdot\left(1+3\cdot\underbrace{\frac{1}{e^n}}_{\to 0}\cdot\underbrace{\frac{1}{n^3}}_{\to 0}\right)}{n^3\cdot\left(1+\underbrace{\frac{3}{n}}_{\to 0}+\underbrace{\frac{3}{n^2}}_{\to 0}+\underbrace{\frac{1}{n^3}}_{\to 0}-2^n\cdot\underbrace{\frac{1}{e^n}}_{\to 0}\cdot\underbrace{\frac{1}{n^3}}_{\to 0}\right.} =$$

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

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

$$= \lim_{n\to\infty} \frac{n^3\cdot\left(1+\frac{3}{e^n\cdot n^3}\right)}{\frac{2^n}{e^n}-n^3-3n^2-3n-1} = \lim_{n\to\infty} \frac{\cancel{n^3}\cdot\left(1+\underbrace{\frac{3}{e^n\cdot n^3}}_{\to 0}\right)}{\cancel{n^3}\cdot\left(\underbrace{\left(\frac{2}{e}\right)^n}_{\to 0}\cdot\frac{1}{e^3}-1-\underbrace{\frac{3}{n}}_{\to 0}-\underbrace{\frac{3}{n^2}}_{\to 0}-\underbrace{\frac{1}{n^3}}_{\to 0}\right)} = \lim_{n\to\infty}\frac{1}{-1} = \underline{\underline{-1}}$$