1. What is the growth

$$n \cdot log(n^2 + \sqrt{n}) + 4 \cdot n + 6 \cdot \sqrt{n} \quad = \quad \Theta(n \cdot log(n))$$

2. What is the growth

$$8 \cdot n^2 \cdot \sqrt{n+1} + 2^{log(n \cdot \sqrt{n})} + log^{10} n^6 \quad = \quad \Theta(n^2 \cdot \sqrt{n})$$

3. What is the growth

$$n^{2.01} + log^5(n^5 + n^{10}) \quad = \quad \Theta(n^{2.01})$$

4. Compute $\sum_{i=1}^{n^5} i$

$$\begin{aligned} \sum_{i=1}^{n^5} i &= \Theta(\int_1^{n^5} i \cdot di) \\ &= \Theta(n^{10}) \end{aligned}$$

5. Compute$\sum_{i=1}^{n^3} i^5$

$$\begin{aligned} \sum_{i=1}^{n^3} i^5 &= \Theta(\int_1^{n^3} i^5 \cdot di) \\ &= \Theta(n^{18}) \end{aligned}$$

6. Compute $\sum_{i=1}^{p^3} \frac{1}{i}$

$$\begin{aligned} \sum_{i=1}^{p^3} \frac{1}{i} &= \Theta(\int_1^{p^3} \frac{1}{i} \cdot di) \\ &= \Theta(ln(n)) \end{aligned}$$

7. Compute $log(n!)$

$$\begin{aligned} log(n!) &= \sum_{i=1}^{n} log(i) \\ &= \Theta(\int_{1}^{n} log(i)) \\ &= \Theta(n \cdot log(n)) \end{aligned}$$

8. Compute $\sum_{i=1}^{n^2} e^i$

$$\begin{aligned} \sum_{i=1}^{n^2} e^i &= \Theta(\int_{1}^{n^2} e^i \cdot di) \\ &= e^{n^2} \end{aligned}$$

9. Compute $\sum_{i=1}^{n} i \cdot e^i$

$$\begin{aligned} \sum_{i=1}^{n} i \cdot e^i &= \Theta(\int_{1}^{n} i \cdot e^i \cdot di) \\ &= \Theta(n \cdot e^n) \end{aligned}$$