2.

(a) $\sum_{i=0}^{n} i^3 = \left[\frac{n(n+1)}{2}\right]^2 = \frac{n^4+2n^3+n^2}{4}.$

$$C_1 n^4 \le \frac{n^4+2n^3+n^2}{4} \le C_2 n^4$$

$$\Rightarrow C_1 \le \frac{1}{4}+\frac{1}{2n}+\frac{1}{4n^2} \le C_2.$$

when $n_0 \ge 1$. $\frac{1}{4}+\frac{1}{2}+\frac{1}{4}=1$. $C_1 \le \frac{1}{4}$. $C_2 \ge 1$ 成立.

$$\frac{1}{4} \le \frac{1}{4}+\frac{1}{2}+\frac{1}{4} \le 1.$$

∵此式合理 ∴$\sum_{i=0}^{n} i^3 = \Theta(n^4)$ 成立.

(b) $\lim_{n\to\infty} \frac{n2^n+6\cdot 2^n}{2^{2^n}} = 0$

Def. $n \ge n_0$. $n2^n+6\cdot 2^n \le C\cdot 2^{2^n}$. $C \Rightarrow$ positive

So, we cannot find a positive number C such that $n2^n+6\cdot 2^n \le C\cdot 2^{2^n}$

(c) $33n^3+4n^2=\Omega(n^2)$

$f(n)=\Omega(g(n)) \Rightarrow g(n)=n^3$.

取 $c=33$.

$f(n)\geq c\,g(n)$

$\Rightarrow 33n^3+4n^2\geq 33n^3$

$\Rightarrow 4n^2\geq 0$. 恆真.

取 $n_0=1$.

$\therefore f(n)\geq n^3$. $\forall n\geq 1$.

$\because n^3\geq n^2\ (\forall n\geq 1)$.

$\Rightarrow f(n)\geq n^2$

$\Rightarrow 33n^3+4n^2=\Omega(n^2)$

3.

(a) $n^2\log n = \Theta(n^2)$,

$n^2\log n \leq Cn^2$. $\forall n \geq n_0$.

$\Rightarrow \log n \leq C$.

$\lim_{n\to\infty} \log n = \infty$.

$\therefore$ 不存在 $C > \infty$. $\Rightarrow$ incorrect.

8. A*B*C.

C	operand	pop
*	operator	⇒ push *CB
B	operand	pop
*		
A		

*CB	operand	pop
*	operator	⇒ push **CBA·[illegible].
A	operand	pop