1. a. $O(n)$
   b. $O(n^2)$
   c. $O(\log n)$

2. (a)

$3n^4+8n^3-3n=\Theta(n^4)$

$3n^4+8n^3-3n \le 3n^4+8n^4 = 11n^4$

$n \ge 0$

$3n^4+8n^3-3n \ge 3n^4$

$n \ge 0$

$\therefore 3n^4+8n^3-3n = \Theta(n^4)$

(b) $\sqrt{17n^2+4n-7} = \Theta(n)$

$\sqrt{17n^2+4n-7} \le \sqrt{17n^2+4n^2} = \sqrt{21}\,n$

$n \ge 0$

$\sqrt{17n^2+4n-7} \ge \sqrt{17n^2-7n^2} = \sqrt{10}\,n$

$n \ge 0$

$\therefore \sqrt{17n^2+4n-7} = \Theta(n)$

2、c

$f(n) = O(g(n))$

$g(n) = O(h(n))$

$\therefore \quad f(n) = c_1 g(n)$

$g(n) = c_2 h(n)$

$\therefore \quad f(n) = c_1 \cdot c_2 h(n)$

$= c_3 h(n)$

$\therefore f(n) = O(h(n))$

3. $\sum_{k=1}^{n} \sqrt{k} = \sqrt{1} + \sqrt{2} + \sqrt{3} \cdots \sqrt{n}$

$= \Theta(n\sqrt{n})$

This is the first part of the function

The second part to iterate is n

So, altogether the function

runs in $\Theta(n\sqrt{n})$

4、① $\sum_{i=1}^{n} i = 1+2+3 \cdots + n$

$= \frac{(1+n)n}{2}$

$O(n^2)$

② $1 \times n + n \times k$

$= n + n \cdot k$

$O(n)$