

H.W 3

$$1.) 1+3+5+\dots+(2n-1)=n^2$$

$$S = \sum_{k=1}^n (2k-1)$$

$$\sum_{k=1}^n 2k - \sum_{k=1}^n 1$$

$$\sum k = 2 \left(\frac{n(n+1)}{2} \right) - n(n+1)$$

$$n=1$$

$$n(n+1) - n$$

$$n^2 + n - n$$

$$= n^2$$

2) ~~outer~~ loop $\rightarrow n$

Inner loop $\rightarrow n$

$$n \times n = n^2$$

$$O(n^2)$$

ii) Outer loop $\rightarrow n$

constant time operation (1)

$$O(n)$$

iii) while loop $\rightarrow i/2$

$$i = n/2^k \rightarrow k = \log_2 n$$

each iteration $\rightarrow O(1)$

so

$$O(\log_2 n)$$

IV) Outer loop $\rightarrow n$

middle loop $\rightarrow n$

inner loop $\rightarrow n$

$$n \times n \times n \rightarrow n^3$$

$$O(n^3)$$

V) 3 iterations $\rightarrow n + n + n = 3n$

$$O(n) + O(n) + O(n) = O(n)$$

3.)