1. $S(n) = 5 + 10 + 15 + \ldots 5n$ $\quad S(n) \in O(n^2)$

$= 5*1 + 5*2 + 5*3 \ldots 5*n$

$= 5(1+2+3 \ldots n)$

$= 5 * \frac{1}{2} n(n-1)$

$= \frac{5}{2}(n^2+n) \quad \in O(n^2)$

$S_1 = 1 + 2 + 3$

$+ \frac{S_1 = n + (n-1)}{2S = n}$

n times

if $t(n) \leq c(g(n))$
$\forall\ n \geq n_0$

$5(n^2+n) \leq \frac{5}{2}(n^2 + n2)$

$= \frac{5}{2} * 2n^2$

$= 5n^2$

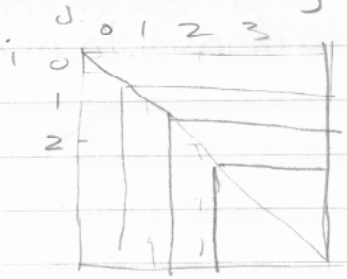
2 a) $n \log n \in O(\log n)$ False

b) $2^{n+1} \in O(2^n)$ True

$2^{n+1} = 2^n * 2^1 = 2(2^n) \in O(2^n)$

```
Enigma (A[0..n-1, 0..n-1])
for i ← 0 to n-2 do
    for j ← 1 to n-1 do
        if A[i,j] ≠ A[j,i]
            return false;
return true
```

2D array



checking symetry along a 45° angle

input: 2D Array
output: returns true if symetrical

input size: nxn matrix or 2D array

basic operation - comparison

worst case = when true and all items must be compared.

$$T(n) = \sum_{i=0}^{n-2} \sum_{j=1}^{n-1} 1 = \ldots = \tfrac{1}{2} n(n-1)$$

highest term is n^2

$\in O(n^2)$ = Quadratic