Assignment 1.1

1. 4^n
2. $12n^6$
3. $5n^2$
4. $n \log_2 n$
5. $k \log_2 n$ if n much bigger than k
6. $40 \log_4 n$
7. $\log_4 n$

Assignment 1.2

a) $T(n) = n^2 + 400n + 5$ $O(n^2)$ for $n \geq 400$

$$400x \leq x^2$$

$$0 \leq x^2 - 400x$$

$$0 \leq x(x - 400)$$

$x \geq 400$

$n \geq 400$

b) $T(n) = 67n + 3n$ $\quad O(n)$

c) $2n + 5n\log n + 100$

$5n\log n = 2n$

$\log n =$

$n = 10^{\frac{2}{5}}$ $\quad O(n \log n)$ for $n > 10^{\frac{2}{5}}$

d) $O(n^2)$

e) $O(2^n)$

f) $O(n)$

g) $O(n)$

Assignment 1.3

1)

_toGregorian :

$1+2+4+3+4+2+3+1+3+4 = O(27)$

day : $O(27)$ year : $O(27)$

month : $O(27)$

monthName : $1+27+1 = O(29)$

dayOfWeek : $27+1+1+1+12 = O(42)$

advanceBy : $1+1+1 = O(3)$

isLeapYear : $2+2+2 = O(6)$

isValidGregorian:

$1+1+4+1+6+1 = O(14)$

printCalendar :

Date. __init__

$29+27+2+2+1+27+27+14+1+2+18+$

$1+1+7(2)+31(1+2+2+3)+1 = O(415)$

Constant time ~
(slightly change with the month it's printing)

2)

isSubsetOf : n := size of subset A

m := size of subset D

n(m)

is Proper Subset Of:

$hm + 2$ $O(nm)$ if $n \sim m$ $O(n^2)$

Linear but if $n \sim m$ can be Quadratic.

3) insert()

0	1	2
a	b	c

I want to insert 'z' in position 0

0	1	2	3
	a	b	c

a b c

h shifts $O(n)$

0	1	2	3
z	a	b	c

remove()

0	1	2	3

I want to remove 'z'

0	1	2	3
	a	b	c

0	1	2
a	b	c

n shifts $O(n)$

Assigment 1.4

a) $O(n)$

b) Best case $O(1)$

Worst case $O(2\log_2(n))$

c) Best case: $n(2+5(1)) = 2n+5n = O(7n)$

Worst case: $n(4+n(1)) = 4n+n^2 = O(n^2)$