EX 2.1 What is the order of the following growth functions?

```
a. 10n^2 + 100n + 1000
b. 10n^3 - 7
c. 2^n + 1000n^3
d. n^2 log n
```

EX 2.1 Answer

No.	Growth Function	Order
a	10n^2 + 100n + 1000	O(n^2)
b	10n^3 - 7	O(n^3)
c	2^n + 1000n^3	O(2^n)
d	n^2 log n	O(n log n)

Ex 2.2 Arrange the growth functions of the previous exercise in ascending order of efficiency for n=10 and again for n=1,000,000.

Ex 2.2 Answer

No.	n = 10		n = 1,000,000	
	Value	Ascending Order	Value	Ascending Order
a	3,000	d < a < b < c	10,000,100,001,000	d < a < b < c
b	9,993		10,000,000,000,000,000,000	
c	101,024		Infinity	
d	100		6,000,000,000,000	

EX 2.3 Write the code necessary to find the largest element in an unsorted array of integers. What is the time complexity of this algorithm?

EX 2.3 Answer - Code:

```
int[] array = {0, 10, 30, 50, 100, 300, 200, 150, 500, 250};
int max = 0;
for (int i=0; i<array.length; i++) {
    max = Math.max(max, array[i]);
}
System.out.println("Max : " + max);
```

EX 2.3 Answer - Time Complexity:

```
t(n) = n
```

EX 2.4 Determine the growth function and order of the following code fragment:

```
for (int count=0; count < n; count++)
{
    for (int count2=0; count2 < n; count2=count2+2) {
        System.out.println(count, count2);
    }
}
```

EX 2.4 Answer

Growth Function	Order
f(x) = x - 0.5	O(n)

EX 2.5 Determine the growth function and order of the following code fragment:

```
for (int count=0; count < n; count++)
{
    for (int count2=0; count2 < n; count2=count2*2) {
        System.out.println(count, count2);
    }
}
```

EX 2.5 Answer

Growth Function	**Order**
f(x) = 0	O(1)