Name __Solutions_____ Discrete I, Quiz 25

Use the code below to answer the following questions.

```
for i from 0 to n-1
   "Line 2"
   for j from 0 to n*n
      "Line 4"
      for k from 0 to i
         "Line 6"
```

1) If "Line 2" is the line of interest and everything else is trivial, what is the asymptotic growth rate of this algorithm?

$$O(n)$$

2) If "Line 4" is the line of interest and everything else is trivial, what is the asymptotic growth rate of this algorithm?

$$O(n \cdot n^2) = O(n^3)$$

Notice that the second loop has n^2 iterations!!

3) If "Line 6" is the line of interest and everything else is trivial, what is the asymptotic growth rate of this algorithm?

$$O(n^4)$$

At first glance maybe it's actually faster than this. If we the innermost loop actually ran n times we would get $\Theta(n^4)$ for sure. As is it requires a more in depth analysis, but indeed our intuition is accurate that actually is $\Theta(n^4)$

4) If "Line 2" and "Line 4" are the lines of interest and everything else is trivial, what is the asymptotic growth rate of this algorithm?

$$O(n + n^3) = O(n^3)$$

5) If "Line 4" and "Line 6" are the lines of interest and everything else is trivial, what is the asymptotic growth rate of this algorithm?

$$O(n^3 + n^4) = O(n^4)$$