

Name: _____

Score: _____ / _____

Quiz 2

Part 1

Let $f(n) = 3n^2 + 8n - 4$ and $g(n) = 8n^2 + 3n + 4$. Then which of the following is wrong?

- A.
 $f(n)$ is $O(g(n))$
- B.
 $g(n)$ is $O(f(n))$
- C.
 $f(n) - g(n)$ is $O(1)$
- D.
 $f(n) + g(n)$ is $O(n^2)$

Answer Point Value: 1.0 points

Answer Key: C

Let $f(n) = 10n^2 + 19$ and $g(n) = 25n^2 + 100n$.

- A. $f(n) > g(n)$ for all $n > 0$ and $f(n)$ is $O(g(n))$
- B. $f(n)$ is not $O(g(n))$. But $g(n)$ is $O(f(n))$.
- C. $f(n)$ is not $O(g(n))$ and $g(n)$ is not $O(f(n))$.
- D. $f(n)$ is $O(g(n))$ and $g(n)$ is $O(f(n))$.

Answer Point Value: 1.0 points

Answer Key: D

Let $f_1(n) = 2n^3 + 81$. $f_2(n) = 4n^5 + 1$. $f_3(n) = 3^n + 10$. $f_4(n) = n! + 19$. Please order them in the increasing order of complexity.

- A. f_1, f_2, f_3, f_4
- B. f_1, f_2, f_4, f_3
- C. f_2, f_1, f_3, f_4
- D. f_2, f_1, f_4, f_3

Answer Point Value: 1.0 points

Answer Key: A

Let $S = \{a, b, c, d, e, f\}$. Then the number of non-empty subsets S has is

- A.
 $6 * 6 = 36$
- B.
 $6! = 720$
- C.
 $2^6 = 64$
- D.
None of the above

Answer Point Value: 1.0 points

Answer Key: D

Not every problem in class P has at least one solution (algorithm) with time complexity $O(n^k)$.

- ☐ True
- ☐ False

Answer Point Value: 1.0 points

Answer Key: False

A problem belongs to class P, if all known solutions (algorithms) has polynomial time complexity.

- ☐ True
- ☐ False

Answer Point Value: 1.0 points

Answer Key: False

Assume a program you wrote took 1000 minutes for $n = 10$. When the input size became 40, then also it 1000 minutes. From that you can conclude that the algorithm has $O(1)$ time complexity.

- ☐ True
- ☐ False

Answer Point Value: 1.0 points

Answer Key: False

For any algorithm A, if $W(n)$ denotes its worst case time complexity and $A(n)$ denotes its average case time complexity then $A(n)$ is $O(W(n))$.

- ☐ True
- ☐ False

Answer Point Value: 1.0 points

Answer Key: True