**Math Problem 1.**

**(1) f(x) = −x2**

f’(x) = - 2x

f’(x) = 0 => x = 0

Variability table

|  |  |  |  |
| --- | --- | --- | --- |
| x |  | 0 |  |
| f’(x) | + | 0 | - |
| f(x) | -∞ | 0 | +∞ |

Eventually decreasing (0, ∞).

**(2) f(x) = x2 + 2x + 1**

f’(x) = 2x + 2

f’(x) = 0 => x = -1

Variability table

|  |  |  |  |
| --- | --- | --- | --- |
| x |  | -1 |  |
| f’(x) | - | 0 | + |
| f(x) | -∞ | 0 | +∞ |

Eventually nondecreasing (0, ∞).

**(3) f(x) =** x3 + x

f’(x) = 3x2 + 1

f’(x) > 0

Variability table

|  |  |  |
| --- | --- | --- |
| x |  |  |
| f’(x) |  | + |
| f(x) | -∞ | +∞ |

increasing (0, ∞).

**Math Problem 2.**

a) The same time.

b) g grows no faster than f.

c) g grows no faster than f.

**Problem 1. GCD Algorithm**

See file pob1.java

**Problem 2. Brute Force Solution.**

See file pob2.java

**Problem 3. Greedy Strategies.**

The algorithm does not work.

S = {2,4,5}, k = 7

When using Greedy Strategies, algorithm make set T with {2,4} then it cannot continue => T = {2,4}. The sum is not equals 7.

**Problem 4.**

It’s correct.

The sum of elements T’ = T – {Sn – 1} = k - sn – 1.

But sum of elements T = k.

sn – 1  T’ => The sum of T’ must be sn – 1 less than sum elements of T.