**Question 5:**

Use the definition of Θ in order to show the following:

1. 5n3+ 2n2+ 3n = Θ(𝑛3)

Proof:

f(n) = 5n3+ 2n2+ 3n, g(n) = n3,

if we take c1 = 10, c2 = 5, n0 = 1,

Then for all n>= n0 we have:

5n3 <= 5n3+ 2n2+ 3n <= 5n3+ 2n3+ 3n3 ,

which is for n >= 1, 5n3 <= 5n3+ 2n2+ 3n <= 10n3,

Therefore: 5n3+ 2n2+ 3n = Θ(𝑛3)

1. √7n2+ 2n − 8 = Θ(𝑛)

Proof:

f(n) = √7n2+ 2n − 8, g(n) = n,

if we take c1 = 3, c2 = √7, n0 = 4,

Then for all n>= n0 we have:

√7n2 <= √7n2+ 2n − 8 <= √9n2 ,

which is for n >= 4, 2n <= √7n2+ 2n − 8 <= 3n,

Therefore: √7n2+ 2n − 8 = Θ(𝑛)