A1:

a)

Relative error:

Relative error:

b)

c)

is unchanged

Relative error:

Relative error:

Q2:

a) The answer becomes an extremely negative number. ().

b) the error in the first step is , in the second step it is .

Since for , let and , solve gives , . Hence , which grows very big, therefore the final answer is far off from the correct answer.

c) assume ,

Where .

by some induction steps similar as above, we know for ,

Where is some function of and increases as increases.Even though is small, when gets big, the error becomes large, and the answer becomes unreliable.

Q3:

a)

when , we have

And

When , we have

And

We have .

Since it is a natural spline, when we have

Hence is the solution.

b)

by substitute into we get .

the interpolation is

Q4:

a)

From second derivatives we know

since and respectively, we can see

and , therefore

Since , , we get

and

Substitute all into the original gives

Simplify gives

b)

Solve to get

Since for any we have

Recall and , substitute and solve gives