EM314 –ASSIGNMENT 03

**LIYANAGE D.P**

**E/15/202**

**SEMESTER 4**

**QUESTION 01**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 |
|  | 1 | 2 | 3 | 4 |
|  |  |  |  |  |

**QUESTION 02**

When we interpolate the function , the interpolation polynomial in Lagrange form is

Since the perfectly interpolated polynomial will be

This is the zeroth-order polynomial

Since

**QUESTION 03**

**(a)** function [] = LagrangeInterpolant(x,y)

i = 1;

q = 1;

syms a;

pa = 0;

while (i <= length(x))

j = 1;

while (j <= length(x))

if i ~= j

q = q\*(a - x(j))/(x(i) - x(j));

end

j = j + 1;

end

pa = pa + q \* y(i);

i = i + 1;

q = 1;

end

disp(simplify(pa));

ezplot(pa);

hold;

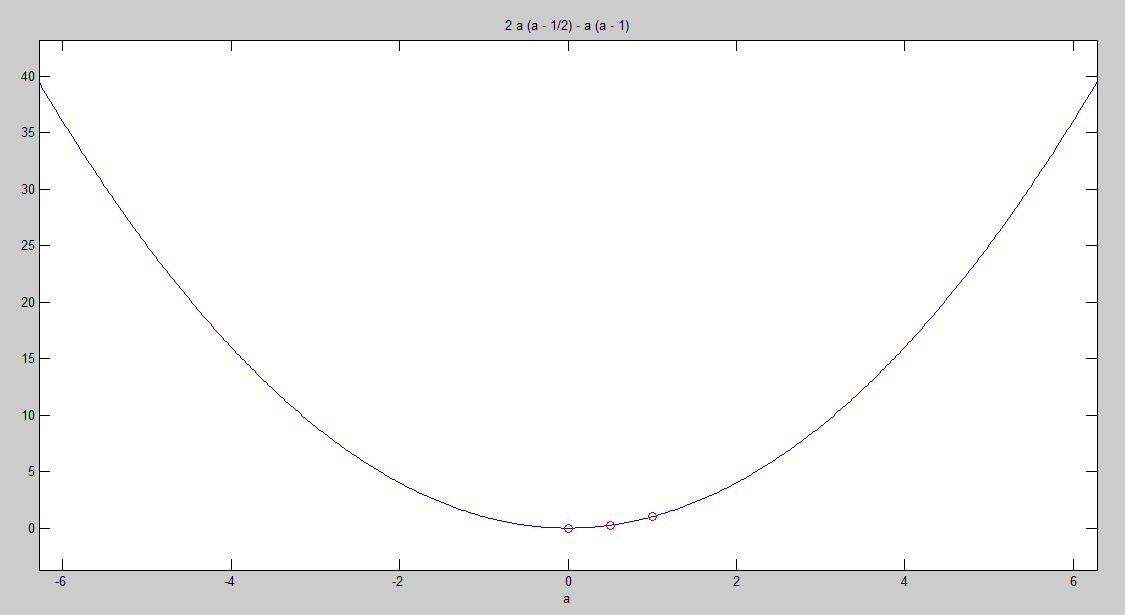
plot(x,y,'ro');

**(b)**

LagrangeInterpolant([0 1/2 1],[0 1/4 1])

a^2

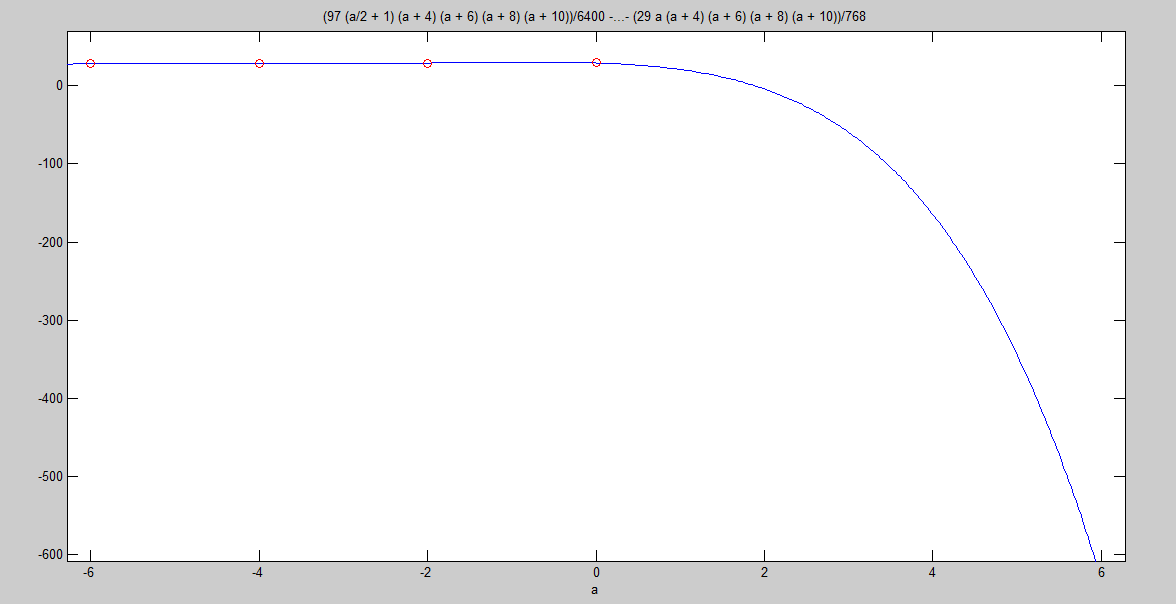
Yes, we get the answer as expected which is



**QUESTION 04**

**(a)**

LagrangeInterpolant([0 -2 -4 -6 -8 -10],[29.1 29 28.7 28.2 20.7 19.1])



**(b)** By using the above code with this command a = sym(-7);

We can obtain the Temperature as = 25.3

But if we obtain this from the given table

Since the 2 answer are somewhat close, we can say that the answer we got from the Lagrange interpolate code is valid.

**(c)** function [] = LagrangeInterpolant(x,y)

i = 1;

q = 1;

syms a;

pa = 0;

while (i <= length(x))

j = 1;

while (j <= length(x))

if i ~= j

q = q\*(a - x(j))/(x(i) - x(j));

end

j = j + 1;

end

pa = pa + q \* y(i);

i = i + 1;

q = 1;

end

t = simplify(diff(pa));

eqn = t == 0;

sola = solve(eqn,a);

disp(sola);

As answer we get 4 data points,

-0.71219561215024224440289385707655

-3.090244960212241338508907742637

-4.9618529705648865831598105669069

-9.2885366457518751169472557579079

So maximum z value would be -9.2885366457518751169472557579079 m