

Ex:- Use the Lagrange interpolation polynomial to estimate the values $f(2)$ and $f(5)$ from the following data

x	0	1	3
$f(x)$	-1	2	7

Sol:-

$$P_2(2) = -\frac{1}{6}(2)^2 + \frac{19}{6}(2) - 1 = -\frac{2}{3} + \frac{19}{3} - 1 = \frac{14}{3} \approx f(2)$$

$$P_2(5) = -\frac{1}{6}(5)^2 + \frac{19}{6}(5) - 1 \approx 10.6667 \approx f(5)$$

البرنامج باستخدام MATLAB

```
% Lagrange's polynomial
clear
clc
x=[0 1 3];
f=[-1 2 7];
xl=input('xl=');
n=length(x);
p=0;
for i=1:n
    l=1;
    for j=1:n
        if i~=j
            l=l*((xl-x(j))/(x(i)-x(j)));
        end
    end
    p=p+f(i)*l;
end
p
```

النتائج

$$x_l=2 \quad ; \quad x_l=5$$

$$p = \quad ; \quad p =$$
$$4.6667 \quad ; \quad 10.6667$$

ماذا نستنتج؟ من المثال أعلاه؟

H.W. :- Use the Lagrange interpolation polynomial to estimate the value $f(3.16)$ from the data

x	3.1	3.2
$f(x)$	1.1314	1.1632