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```
%%Given data
x = [ 1.5 1.9 2.1 2.4 2.6 3.1];
y = [ 1.0628 1.3961 1.5432 1.7349 1.8423 2.0397];

%%we need to evaluate at 3 nearest neighbour points of 1.75
xevalp = [ 1.5 1.9 2.1];
yevalp = [ 1.0628 1.3961 1.5432];

%order of polynomial interpolation is 3
n = 3;

A = [ n sum(xevalp) sumofsq(xevalp);sum(xevalp) sumofsq(xevalp)
 sumofcub(xevalp);sumofsq(xevalp) sumofcub(xevalp) sumof4th(xevalp) ];
B = [sum(yevalp) sumxy(xevalp,yevalp) sumyx2(xevalp,yevalp) ]';

poly = (A\B);
poly = poly';
```

calculating the derivates of the polynomial

```
dp = polyder(poly);
dp2 = polyder(dp);
```

Calculating the value of the given point

```
first_derivate = polyval(dp,1.75);
second_derivate_value = polyval(dp2,1.75);
```

Solution is here

```
fprintf('The coefficents of polynomial are');
poly
fprintf('\nThe First Derivative is %f and \n\nsecond derivative is %f
\n',first_derivate,second_derivate_value)
```

```
The coefficents of polynomial are
poly =

   -0.6514    1.3872   -0.1629
```

The First Derivative is -0.892690 and

second derivative is -1.302775

set of functin for calculating the sums of x and y

```
function sum1 = sum(x)
   sum1 = 0;
   for i = 1:length(x)
       sum1 = sum1 + x(i);
   i = i+1;
   end
end

function sum2 = sumofsq(x)
   sum2 = 0;
   for i = 1:length(x)
   sum2 = sum2 + (x(i)).^2;
   i = i+1;
   end
end

function sum3 = sumofcub(x)
   sum3 = 0;
   for i = 1:length(x)
       sum3 = sum3 + (x(i)).^3;
       i = i+1;
   end
end

function sum4 = sumof4th(x)
sum4 = 0;
for i = 1:length(x)
    sum4 = sum4 + (x(i)).^4;
    i = i+1;
end
end

function sum5 = sumxy(x,y)
  sum5 = 0;
  for i = 1:length(x)
      sum5 = sum5 + y(i)*x(i);
      i = i+1;
  end
end

function sum6 = sumyx2(x,y)
sum6 = 0;
for i = 1:length(x)
    sum6 = sum6 + y(i)*((x(i).^2));
    i = i +1;
```

```
end
end
```

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