

# Homework #1

## Problem 1

### Script

```
clear all

clc

close all

format compact

% Use 1/2 inch increments for calculating the deflections
x = 0:0.5:360;

% Calculate the defelction
for i=1:length(x)

    y(i)=(800*x(i)^3 - 13.68*10^6*x(i) - 2.5*x(i)^4 + 2.5*(x(i)-120)^4*(x(i)>=120)
+600*(x(i)-240)^3*(x(i)>=240))/(3.190*10^9);

end

[max_y, max_x]=max(abs(y));

% Plot
hold on

plot(x,y,'Linewidth',2 );

plot(x(max_x),y(max_x),'o','MarkerSize',8,'MarkerEdgeColor','k','MarkerFaceColor','r')

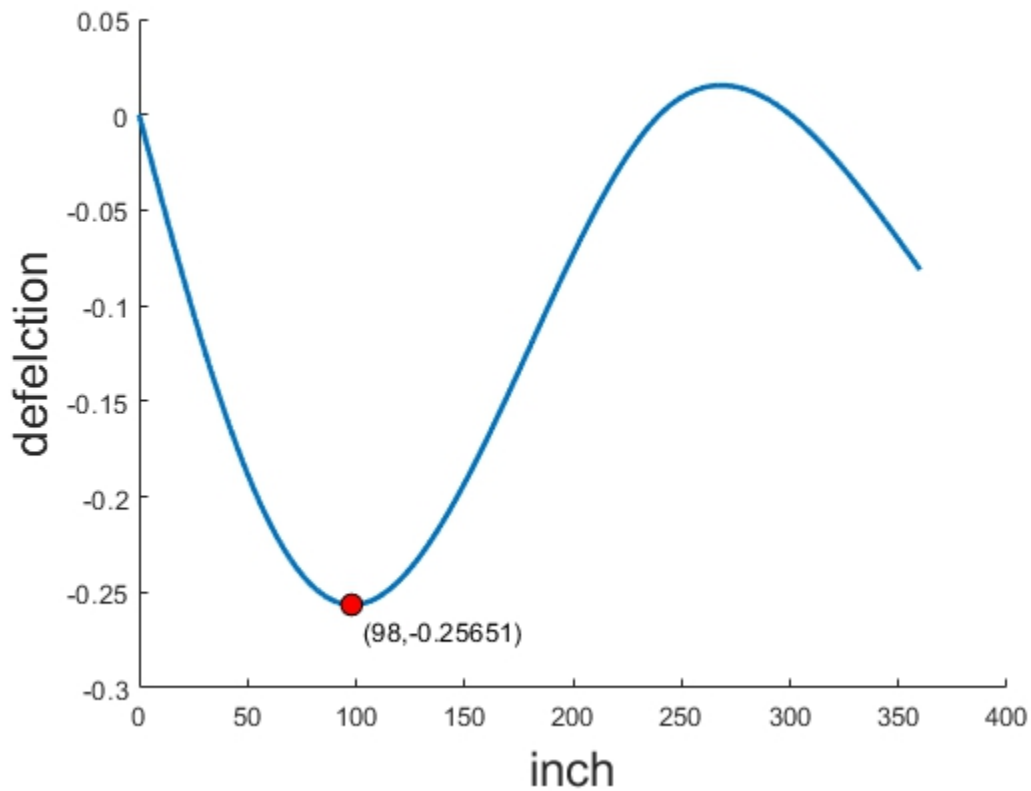
text(x(max_x)*1.05,y(max_x)*1.05, ['(',num2str(x(max_x)),',',',num2str(y(max_x)),',')'])

xlabel('inch','FontSize', 18);

ylabel('defelction','FontSize', 18);

hold off
```

## Graph



## Problem 2

### Script

```
clear all

close all

clc

format compact

% 1.Enter data from file Points.txt to Matlab workspace

MyFile = fopen ('Points.txt','rt');

A=textscan(MyFile,'%f %f','HeaderLines',1);

A=cell2mat(A);

fclose(MyFile);

x=A(:,1);
```

```

y=A(:,2);

% 2.Draw the polygon;

figure;

hold on

plot([x;x] ,[y;y], 'Color','r','Linewidth',2,'DisplayName','Polygon')


% 3.Calculate the area of the polygon, print the answer to the Command Window;

area = area_of_the_polygon(x,y);

fprintf('the area of the polygon %g\n',area);


% 4.Calculate the coordinates of the centroid of the polygon,print the answer to the
Command Window

[coordinates_x,coordinates_y] = coordinates_of_the_centroid(x,y,area);

fprintf('the coordinates of the centroid of the polygon
(%g,%g)\n',coordinates_x,coordinates_y);


% 2.Draw the coordinates;

plot(coordinates_x ,coordinates_y , 'o','MarkerSize',8,'MarkerEdgeColor','k','MarkerFaceCo
lor','g','DisplayName','Center')

plot(x ,y , 'o','MarkerSize',8,'MarkerEdgeColor','k','MarkerFaceColor','r','DisplayName','
Point')

legend ('FontSize',12,'FontWeight','bold')

hold off


function area = area_of_the_polygon(x,y)

n=length(x);

area = 0;

for i = 1:n-1

    area = area + 1/2 *(x(i) * y(i+1)-x(i+1) * y(i));

end

end

```

```

function [coordinates_x,coordinates_y] = coordinates_of_the_centroid(x,y,area)

n=length(x);

coordinates_x = 0;

coordinates_y = 0;

for i = 1:n-1

    coordinates_x = coordinates_x +(x(i)+x(i+1)) * (x(i) * y(i+1)-x(i+1) * y(i))/6/area;

    coordinates_y = coordinates_y + (y(i)+y(i+1)) * (x(i) * y(i+1)-x(i+1) * y(i))/6/area;

end

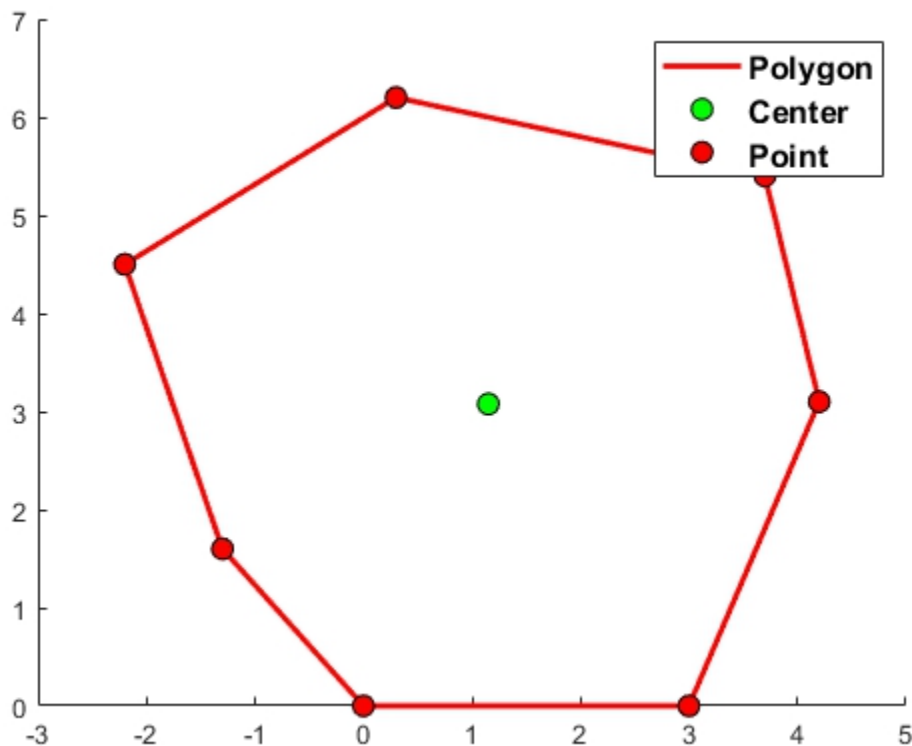
end

```

## Result

the area of the polygon 29.575  
the coordinates of the centroid of the polygon (1.15054,3.07711)

## Graph



### Problem 3

#### Script

```
clear all

close all

clc


%   Create File

fid = fopen('Problem3_Result.txt', 'wt');

payment=1199.11;


%   Calculate Balance

Balance_End = repmat(200000,1, 360);

Balance_Begin=repmat(0, 1, 360);

Balance_Begin(1)=Balance_End(1)*1.005;

Balance_End(1)= Balance_Begin(1)-payment;

for month = 2:360

    Balance_Begin(month)=Balance_End(month-1)*1.005;

    Balance_End(month)=Balance_Begin(month)-payment;

end

%   Write File

fprintf (fid, '          Beginning          Ending \n');

fprintf (fid, 'Month Balance    Payment Balance \n');

fprintf (fid, '===== \n');

for month = 1:360

    if month<=12

        fprintf (fid, '%5i %-9.2f%8.2f%10.2f\n', month, Balance_Begin(month), payment, Balance_End(month));

    end

    if month==359

        fprintf (fid, '\n\n\n');

    end

end
```

```

if month>=359

    fprintf (fid,'%5i %-
9.2f%8.2f%10.2f\n',month,Balance_Begin(month),payment,Balance_End(month));

end

end

fprintf(fid,'\nFinal balance to be refunded = %.2f\n',Balance_End(month));

fclose(fid);

```

## Result

	Beginning		Ending
Month	Balance	Payment	Balance
=====	=====	=====	=====
1	201000.00	1199.11	199800.89
2	200799.89	1199.11	199600.78
3	200598.79	1199.11	199399.68
4	200396.68	1199.11	199197.57
5	200193.55	1199.11	198994.44
6	199989.42	1199.11	198790.31
7	199784.26	1199.11	198585.15
8	199578.07	1199.11	198378.96
9	199370.86	1199.11	198171.75
10	199162.61	1199.11	197963.50
11	198953.32	1199.11	197754.21
12	198742.98	1199.11	197543.87

359	2383.31	1199.11	1184.20
360	1190.12	1199.11	-8.99

Final balance to be refunded = -8.99