1 Problem 1

```
clear;clc; close all;

t = [-1:.1:1];
W = @(t) t - 1; w = W(t);
Y = @(t) 2*t.^2 + 2; y = Y(t);

figure1 = figure;
plot(t,w,'-or',t,y,'--b')
xlabel('Time(seconds)')
ylabel('Function Output')
title('Problem #1.1')
legend('w(t)','y(t)','Location','SouthEast')

figure2 = figure;
plot(t,w,'*g')
hold on
plot(t,y,'--xk')
hold off
ax = gca;
ax.FontSize = 14;
xlabel('Time(seconds)')
ylabel('Function Output')
ax.FontSize = 18;
title('Problem #1.2')
legend('w(t)','y(t)','Location','best')
```

2 Problem 2

```
clear;clc;clear all

x = [78, 98, 77, 88, 43, 56, 76, 81, 19, 90, 79, 84, 86, 99, 100, 100,...
    94, 91, 34, 54, 65, 66, 63, 34, 59, 60, 67, 92, 84, 79, 61, 64, 61,...
    79, 87, 82, 91, 90 ];

bin_edge = [0,20,40,60,80,100.1];
n = histogram(x,bin_edge);
xlim([0 100])
```

3 Problem 3

```
clear;clc;clear all

% Triangle Verticies
P1 = [0 0]; % P1 Coordinate [x,y]
P2 = [1 sqrt(3)]; % P2 Coordinate
P3 = [2 0]; % P3 Coordinate
Pi = [randi([-10 10]) randi([-10 10])]; % "Random" initial point
N = 10^5; % number of iterations

% Calling Function

Chaos(P1,P2,P3,Pi,N);

function [] = Chaos(p1,p2,p3,pi,n)

% Distance formula
% dx = p2(1,1) -p1(1,1);
% dy = p2(1,2) -p1(1,2);
% d = sqrt(dx^2 + dy^2);
P = zeros(n+1,2);
P(1,1) = pi(1);
P(1,2) = pi(2); % Why?

for i = 2:n+1 % Why?

% Roll Die
r = randi([0 30]);

% Midpoint rule
if r <= 10
    P(i,1) = (P(i-1,1) -p1(1))/2 +p1(1); % x-Coordinate
    P(i,2) = (P(i-1,2) -p1(2))/2 +p1(2); % y-Coordinate
elseif r <= 20
    P(i,1) = (P(i-1,1) -p2(1))/2 +p2(1); % x-Coordinate
    P(i,2) = (P(i-1,2) -p2(2))/2 +p2(2); % y-Coordinate
else % for r == 3 case
    P(i,1) = (P(i-1,1) -p3(1))/2 +p3(1); % x-Coordinate
    P(i,2) = (P(i-1,2) -p3(2))/2 +p3(2); % y-Coordinate
end
end

% Graphing
TriVert = [p1; p2; p3];
figure1 = figure;
```

```
plot(TriVert(:,1),TriVert(:,2),'*k','MarkerSize',12)
hold on
plot(P(:,1),P(:,2),'xr')
hold off
title('Sierpinski Triangle')
xlabel('x-coordinate')
ylabel('y-coordinate')

end
```