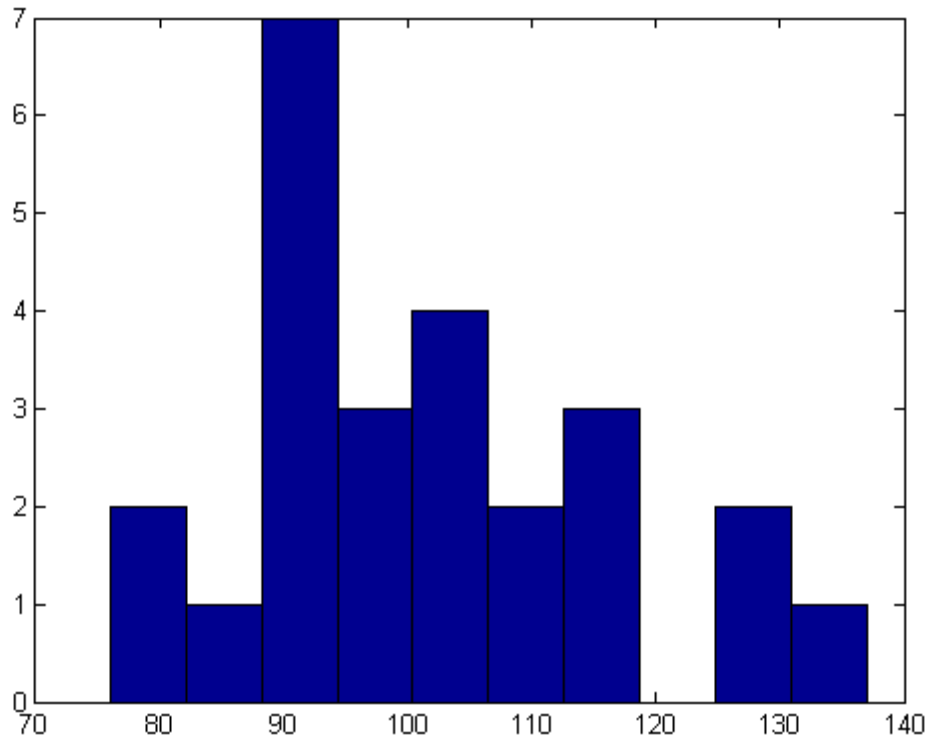
Table of Contents


```
%%%%%%%%% Math 430 - Homework 6 %%%%%%%%%%%%
%
% MONTES Virginie
% Due October 30
%
%%Problem 1:


clear all
close all
%
%   this part estimates the parameters of our distribution

 X = load('-ascii', 'ice4.txt');

figure(1)
hist(X)
n = length(X);

meanX = mean(X);          % these are sample (empirical) moments
varX = var(X);            % use these for method of moments
```



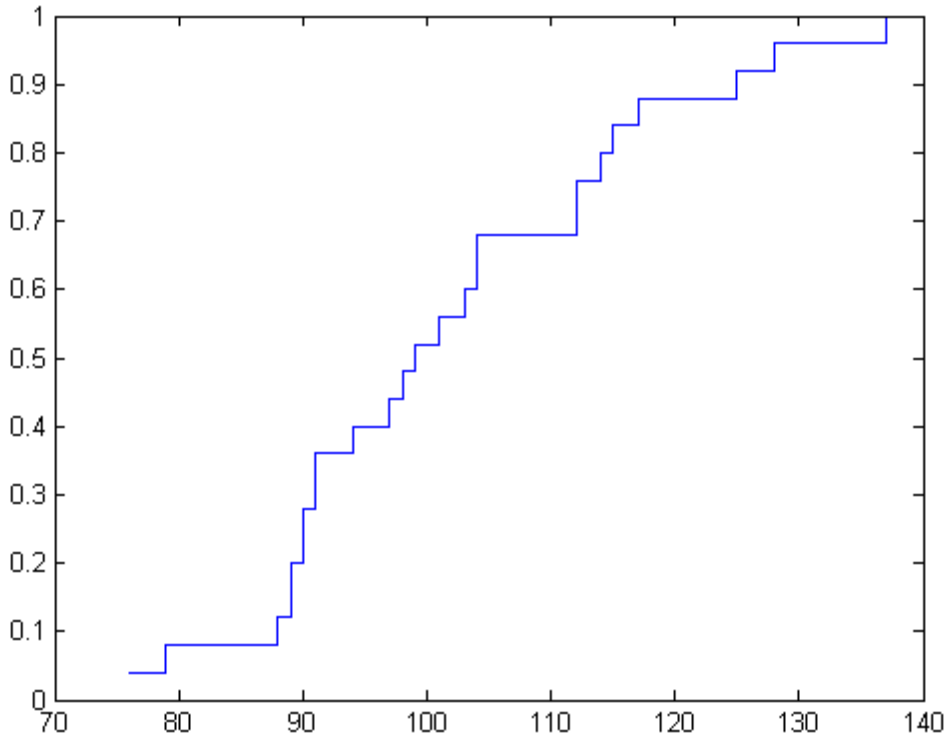
for Gamma

```
beta = varX/meanX
alpha = meanX/beta
```

```
beta =

    2.2771

alpha =

   44.6708
```

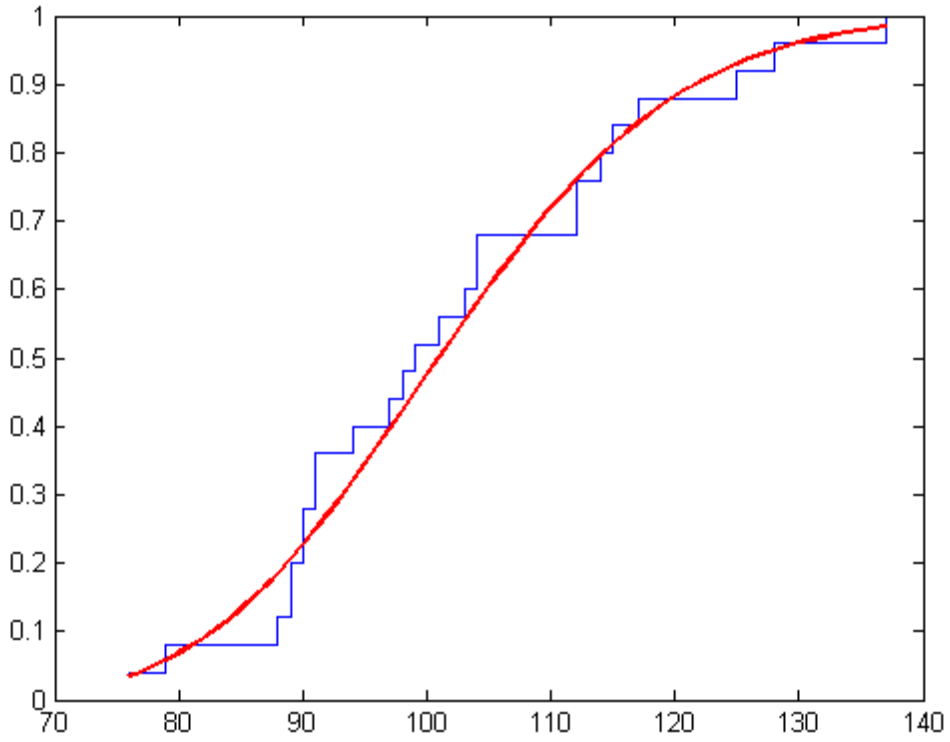
plot Empirical cdf to see if adequate

```
figure(2)
stairs(sort(X), (1:n)/n)
  hold on
```



Gamma CDF matching?

```
gridx = min(X):max(X);
plot(gridx, gamcdf(gridx, alpha, beta),'r', 'LineWidth',2 )
  hold off
```

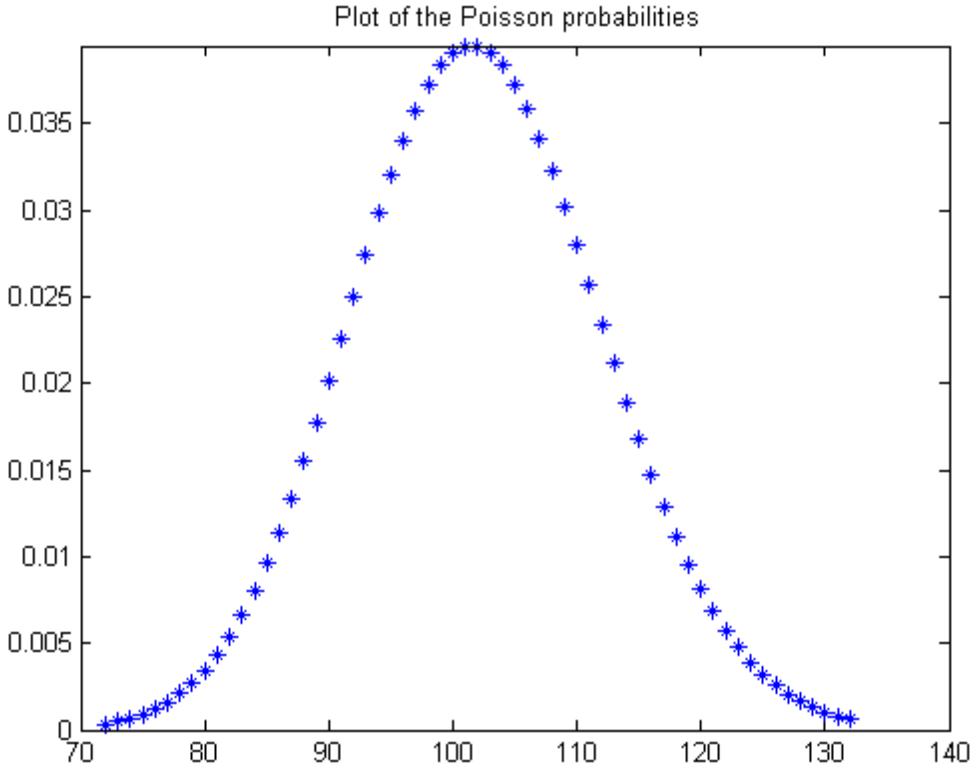


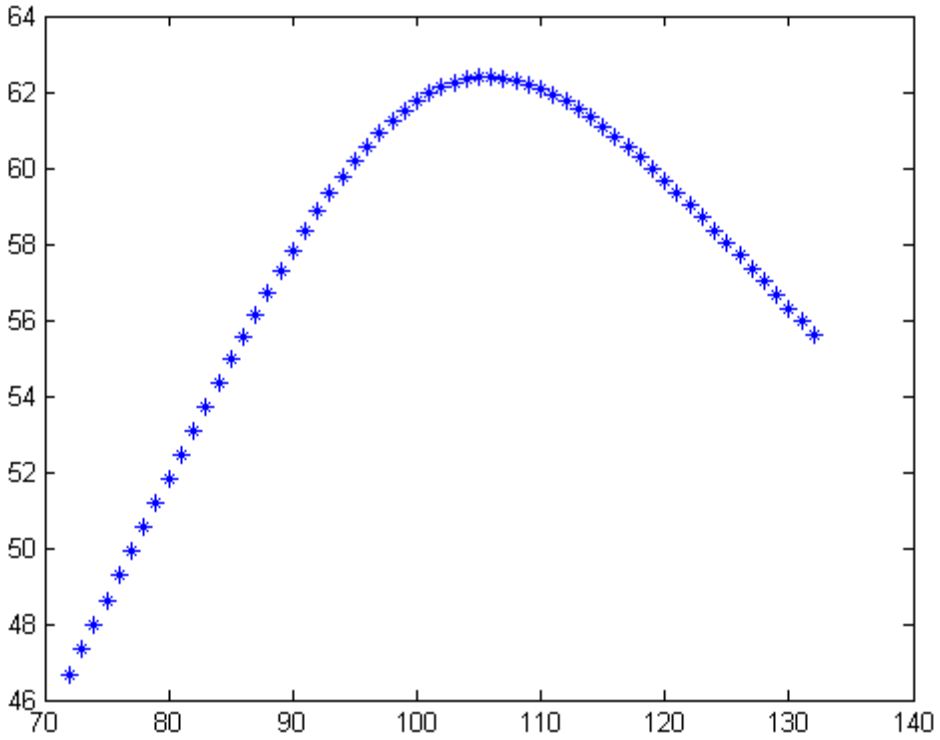
Find the ideal amount A of ice-cream to order and the expected profit

```
%  this simple model assumes Poisson distribution with given mean

poismean = 102;
sigma = sqrt(poismean);

D = round(max(0,poismean - 3*sigma)):round(poismean + 3*sigma);   % likely range o
logProb = -poismean + (D*log(poismean) - gammaln(D+1));
Prob = exp(logProb);

figure(3)
plot(D, Prob,'*')
   ylim([0 max(Prob)]);
   title(' Plot of the Poisson probabilities')

Cost = 0.35;
Price = 1;

Range = D;
L = length(Range);
Sold = zeros(max(D),1);          % amount sold, will vary depending on A and D
EProfit = zeros(L,1);   % expected profit for each given A
shift = min(Range) - 1;

for A = Range,    % this can be done in vector format more easily
    Sold= min(A, D);
    Gain = Sold*Price - A*Cost;
```

```
    EProfit(A-shift) = sum(Prob.* Gain);
end

figure(4)
plot(Range, EProfit,'*')
[Y,I] = sort(EProfit);
whichmax = I(L);

disp(['Poissonian distribution: Expected Profit is maximized at A= ', num2str(Rang
```

Poissonian distribution: Expected Profit is maximized at A= 106 with the value of



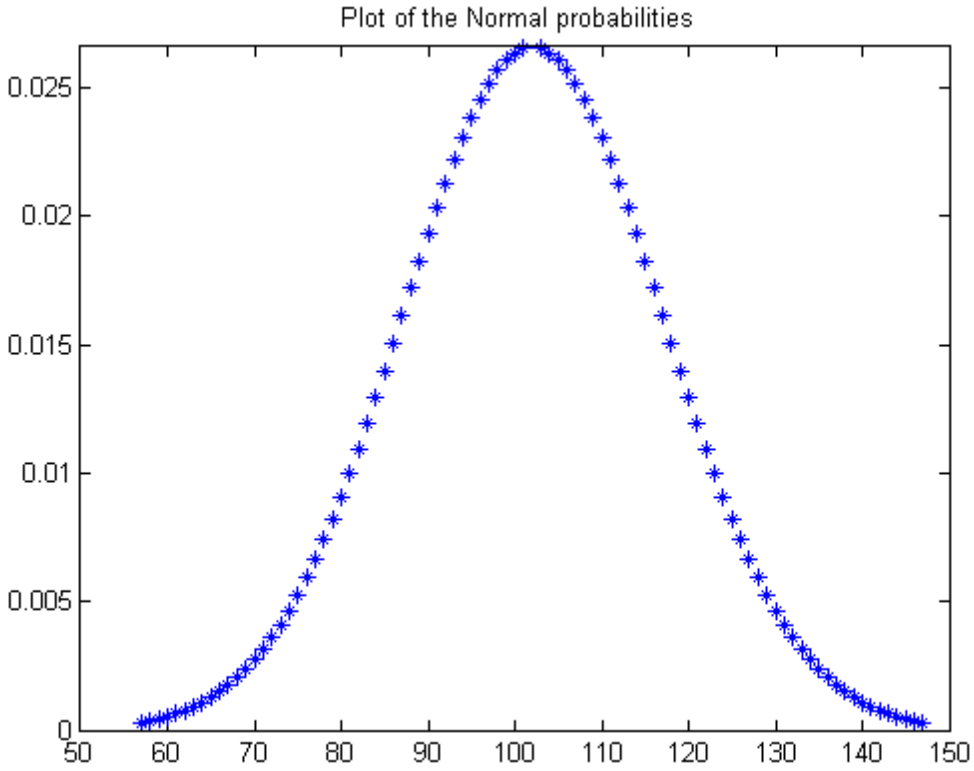


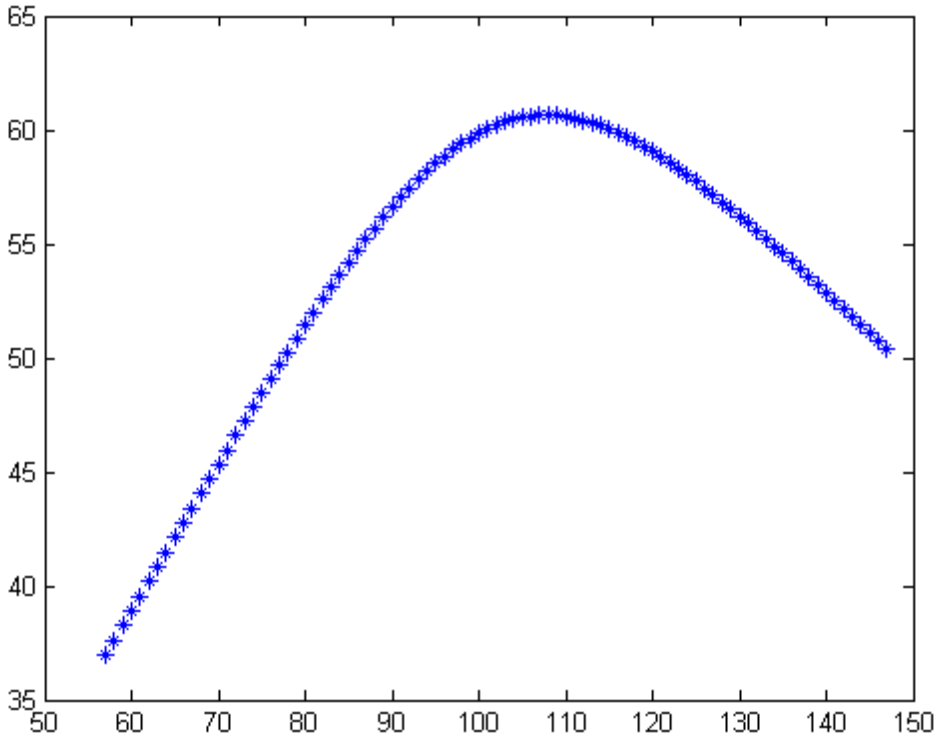
Find the ideal amount A of ice-cream to order and the expected profit

```
%  this simple model assumes Normal distribution with given mean and st.dev.

mean = 102;
sigma = 15;

D = round(max(0,mean - 3*sigma)):round(mean + 3*sigma);   % likely range of the re
Prob = 0*D;

for i = D,
   Prob(i - min(D) + 1) = normcdf(i+0.5,mean, sigma) - normcdf(i-0.5, mean, sigma)
end

figure(5)
plot(D, Prob,'*')
   ylim([0 max(Prob)]);
   title(' Plot of the Normal probabilities')

   Cost = 0.35;
   Price = 1;

Range = D;
L = length(Range);
Sold = zeros(max(D),1);          % amount sold, will vary depending on A and D
EProfit = zeros(L,1);            % expected profit for each given A
shift = min(Range) - 1;
```

```
for A = Range,    % this can be done in vector format more easily
    Sold= min(A, D);
    Gain = Sold*Price - A*Cost;
    EProfit(A-shift) = sum(Prob.* Gain);
end

figure(6)
plot(Range, EProfit,'*')
[Y,I] = sort(EProfit);
whichmax = I(L);

disp(['Normal distribution: Expected Profit is maximized at A= ', num2str(Range(wh
```

Normal distribution: Expected Profit is maximized at A= 108 with the value of $60.





Published with MATLAB® 7.9