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Problem 1.

Use makedist to create an exponential distribution object. Set the mean (?) to 100.

```
mu = 100;
pd = makedist('exponential','mu',mu);
```

Problem 2.

What is the formula for the probability density function of this distribution? Y=f(x|mu)=1/mu * exp(-x/mu);

Problem 3.

Use Matlab to find its mean, median, interquartile range, variance, and standard deviation

```
mean0 = mean(pd)
median0 = median(pd)
r = iqr(pd)
v = var(pd)
s = std(pd)
```

```
mean0 =

   100


median0 =

   69.3147


r =

  109.8612
```

```
v =

       10000


s =

   100
```

Problem 4.

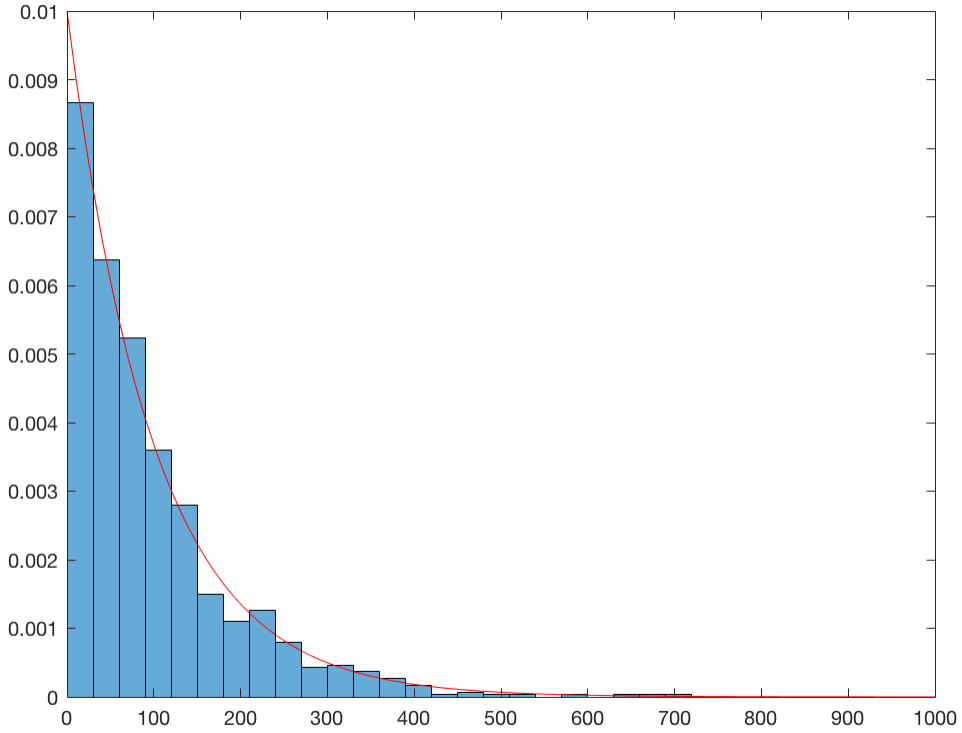
Use Matlab?s random to generate data sets sampled from this distribution. Create three data sets with 2, 10, and 1000 samples each.

```
set1 = random(pd,2,1);
set2 = random(pd,10,1);
set3 = random(pd,1000,1);
```

Problem 5.

Use histogram to plot a histogram for the data set with 1000 samples. Overlay this histogram with the pdf (Use linspace and pdf).

```
histogram(set3,'Normalization','pdf');hold on;
x=linspace(0,1000);
y = pdf(pd,x);
plot(x,y,'r');hold off;
```



Problem 6.

Now use random to generate three matrices of samples; one 2×1000, another 10×1000, and another 1000×1000.

```
set4 = random(pd,2,1000);
set5 = random(pd,10,1000);
set6 = random(pd,1000,1000);
```

Problem 7.

Compute the sample means. You will get three arrays of size 1×1000 corresponding to averages of samples of size 2, 10, and 1000.

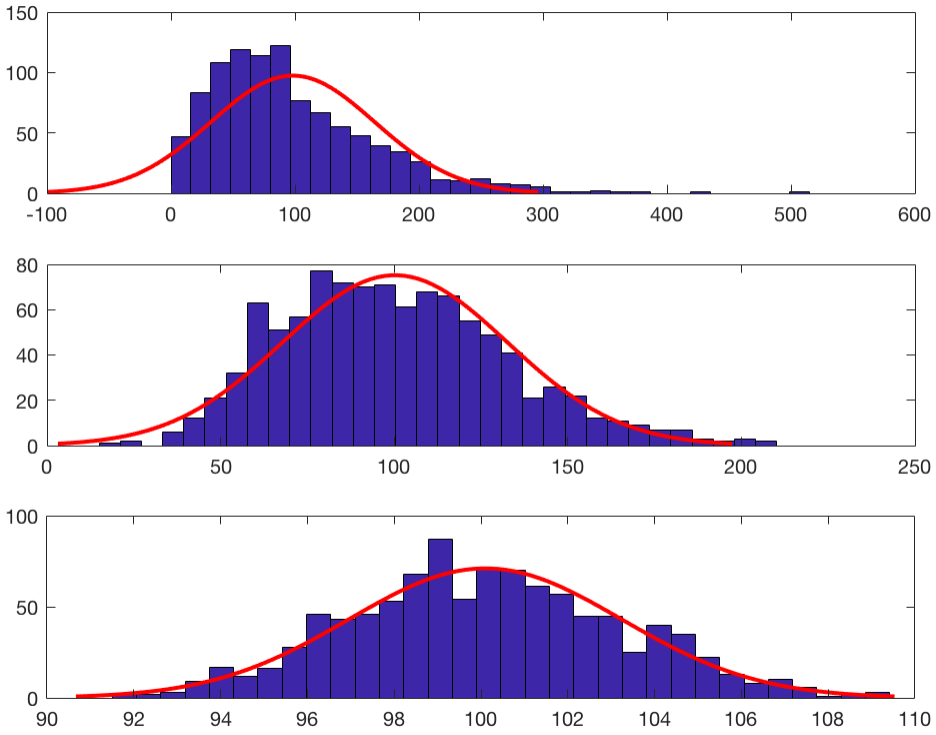
```
m4=mean(set4);
m5=mean(set5);
m6=mean(set6);
```

Problem 8.

Plot histograms of each of these arrays of sample means. Overlay the histograms with a Gaussian fit. Hint: histfit.

```
subplot(3,1,1);
histfit(m4);
```

```
subplot(3,1,2);
histfit(m5);
subplot(3,1,3);
histfit(m6)
```



Problem 9.

How does this result relate to the Central Limit Theorem? Theory: Anything that results from the sum of a large number of similar and independent random effects is likely to by normally distributed. The histfit in Problem 8 looks like normally distributed which fits the Central Limit Theorem.

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