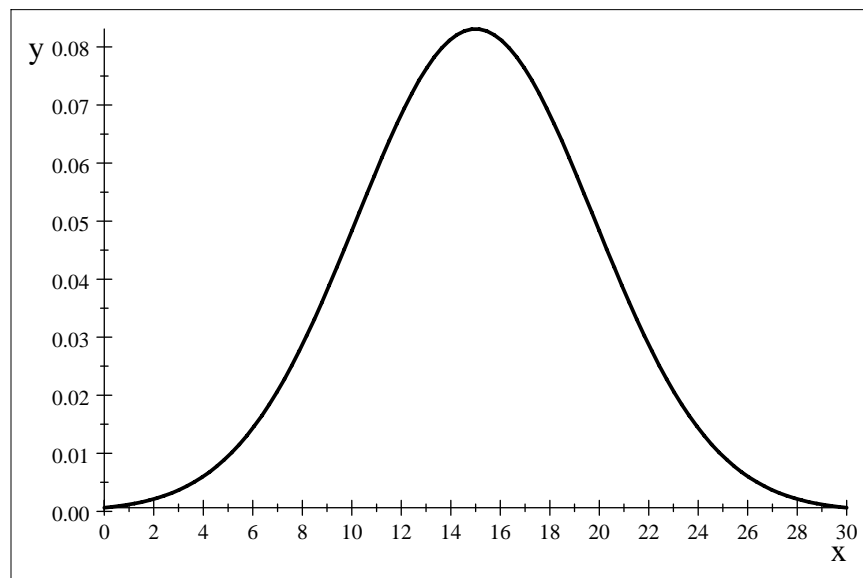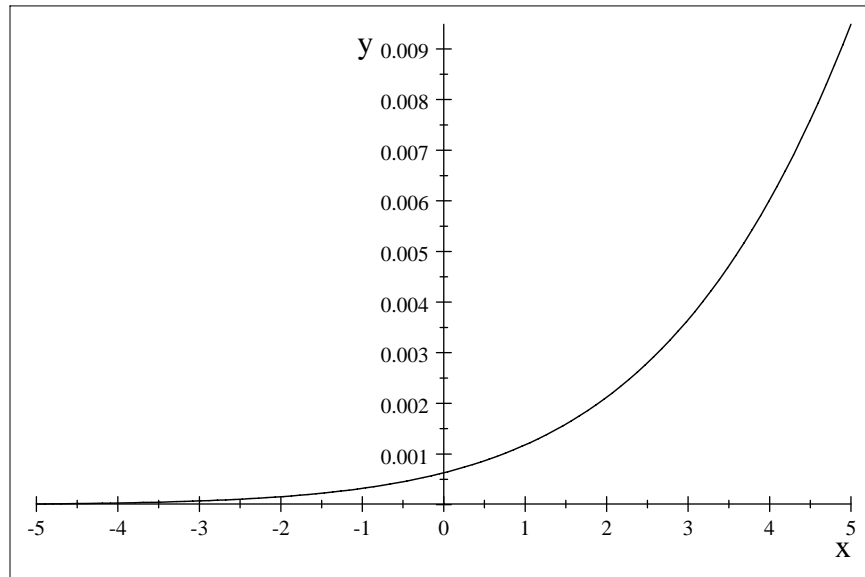Question: The time that it takes to process a certain application shows a mean of 15 minuts and standard deviation of 4.8 minutes. If this distribution is normal, find the probability that the processing time for one such form will be more than 20 minutes.
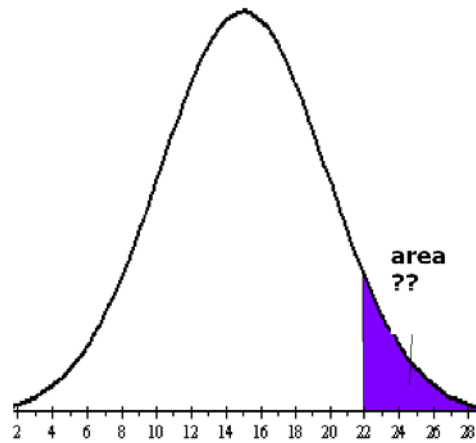
Density function:

$$a(x) = \frac{1}{4.8\sqrt{2\pi}} e^{-\left((x-15)^2/\left(2\times4.8^2\right)\right)}$$

(I wrote the above equation only to make a graph)

$a(x)$

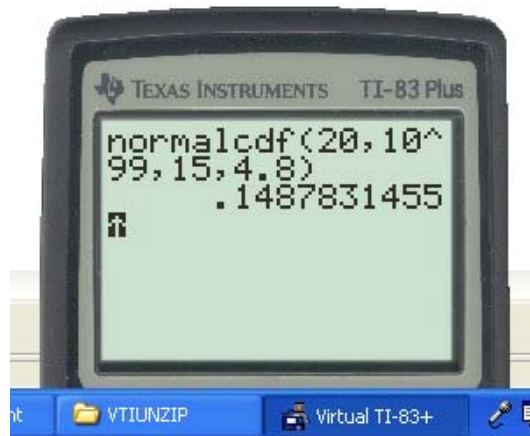We would like find the area to the right of x=20 that is

A use of TI83plus gives us the value as

Click on 2nd VARS to get to DISTR

Choose the normalcdf

and fill the entries as (you may read the document or watch the video on using TI83plus for normal curve areas on this webpage if this is not clear.)

What you see is in the calculator is the area from 20 to ∞
under THE normal curve with mean 15 and standard deviation 4.8.

The probability that an application will take more than 20 minutes
to process is approximately 0.1488

Now we are looking at a different question. We would like to find the probability that the mean time for processing 4 randomly selected
applications.

Remember that our simulation confirmed the following rule:
(I am creating a video of this simulation and posting it in this section.)

If a population (x) has mean μ and standard deviation σ

then the means $(\overline{x})$ of simple random samples of size n

has mean μ and standard deviation $\dfrac{\sigma}{\sqrt{n}}$

In addition if the x has a normal distribution, $\overline{x}$ has a normal distribution as well.

Now recall our question:

Now we are looking at a different question. We would like to find the probability that the mean time for processing 4 randomly selected
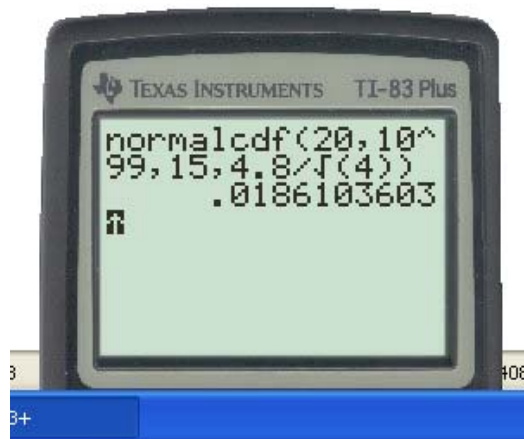applications.

We have $\mu = 15$, $\sigma = 4.8$
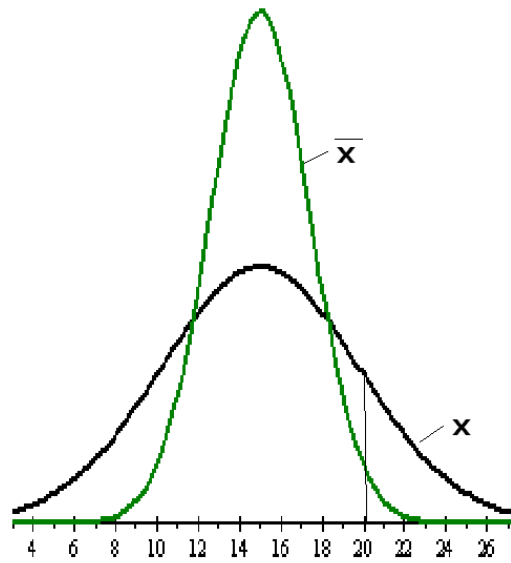sample size is $n = 4$

therefore for $\overline{x}$, the mean is still 15 and the sandard deviation is
$$\frac{4.8}{\sqrt{4}} = 2.4$$

The probability that

$$\overline{x} > 20$$

is approximately 0.0186

Please read the notes for the Chapter 10, work on the practice problems from Chapter 10, we shall have regular class on October 25.