Problem set 8-3

Normal Cumulative Density Function

```
NORMAL FLOAT AUTO REAL DEGREE MP
        normalcdf
 lower:1800
 upper:2100
 µ:1500
 σ:300
 Paste
```

```
NORMAL FLOAT AUTO REAL DEGREE MP



 Area=.135905
 low=1800          up=2100
```
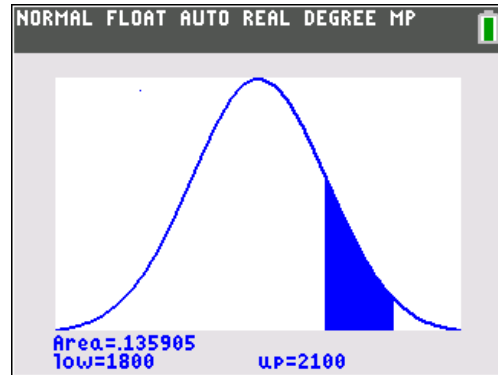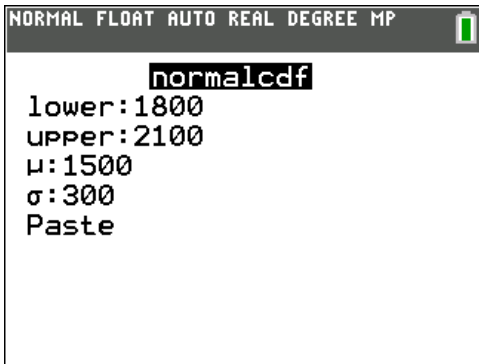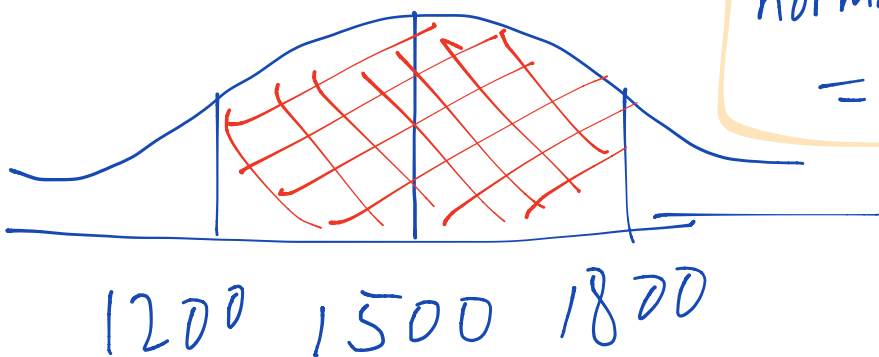
Normalcdf(lowerbound,upperbound,µ,σ)

1.   Thinking back to the SAT data with mean of about 1500 and standard deviation of about 300.

a)   What proportion of the scores are between 1800 and 2100?
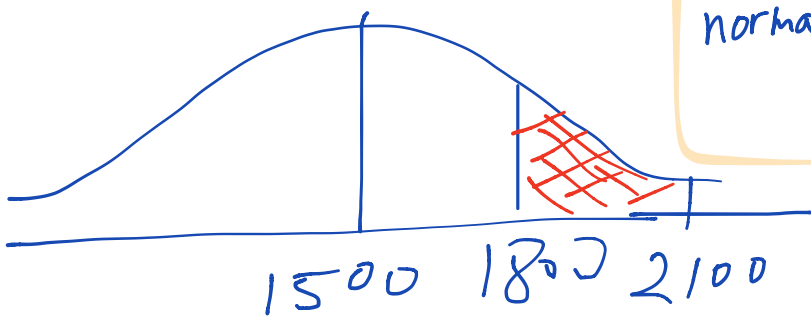
normalcdf(1800,2100,1500,300)

= .1359

1500 1800 2100

b)   What proportion of the scores are between 1200 and 1800?

normalcdf(1200,1800,1500,300)

= .6827

1200 1500 1800

2.   One of the most commonly used IQ scales is the Wechsler IQ scale, the scores of which are normally distributed with a mean of 100 and standard deviation of 15. Mensa is an organization for people with high IQs; you need an IQ of 130 or higher to become a member.

$\bar{X} = 100$
$s = 15$

What proportion of the population can be admitted to Mensa?

Source: Rodrigo de la Jara, IQ Basics, http://www.iqcomparisonsite.com/IQBasics.aspx, 3/17/2009.

normalcdf(130, E99, 100, 15)
= .0228

100   130
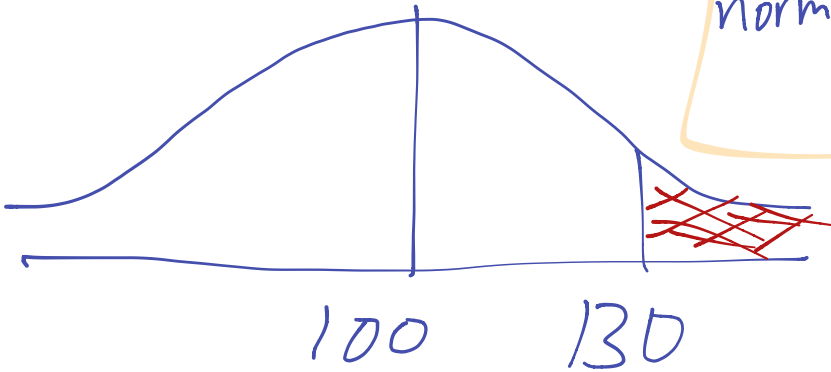
3.   The Standard Normal Distribution is a normal distribution with a mean of 0 and standard deviation of 1. Use Normalcdf to find out what proportion of data of the Standard Normal Distribution are:
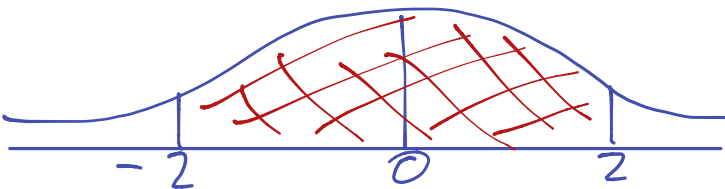[Show what you typed in your calculator as well as your answer as a percent.]

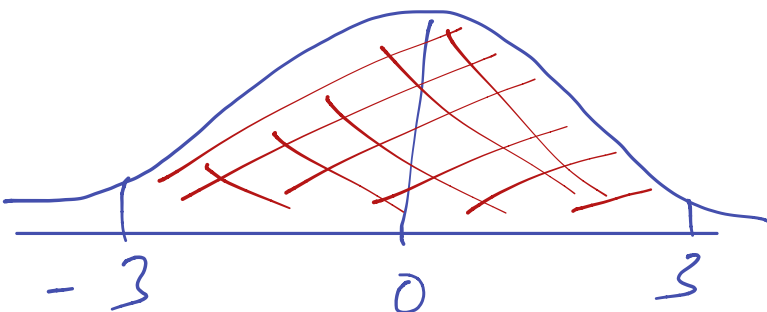a)   within one standard deviation of the mean.

normalcdf(-1, 1, 0, 1) = .6827

-1   0   1
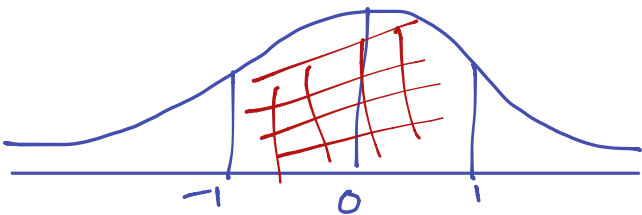
b)   within two standard deviations of the mean.

normalcdf(-2, 2, 0, 1) = .9545

-2   0   2

c)   within three standard deviations of the mean.

normalcdf(-3, 3, 0, 1) = .9973

-3   0   3

4. A Nielsen study about cell phone usage by teenagers reported that the average number of text messages per month was 1,742. If the results were normally distributed and the standard deviation of number of text messages per month was 200, what portion:

$\bar{x} = 1742$
$S = 200$

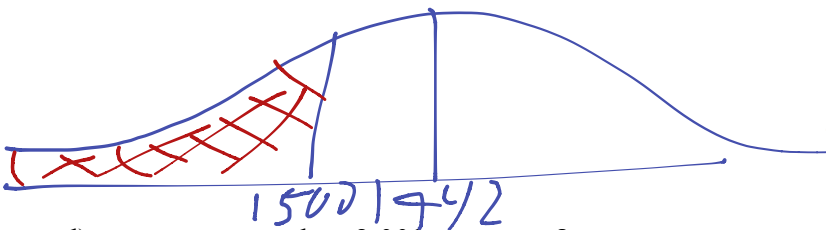a) sent between 1,542 and 1,942 messages?
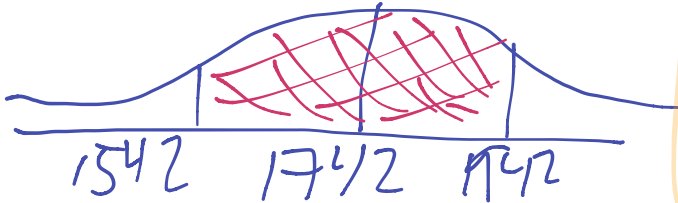
normalcdf (1542, 1942, 1742, 200)
= .6827

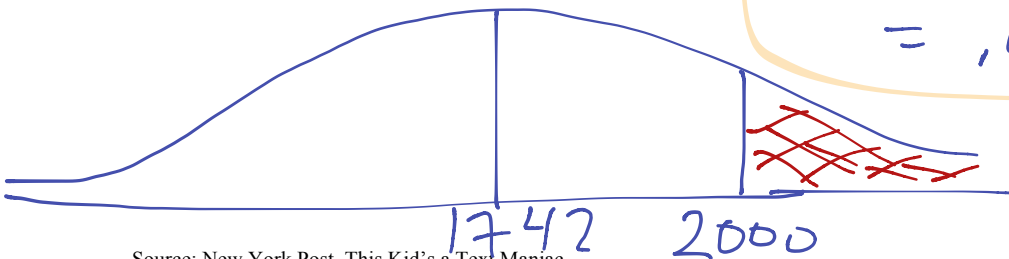b) sent between 1,000 and 2,000 message?
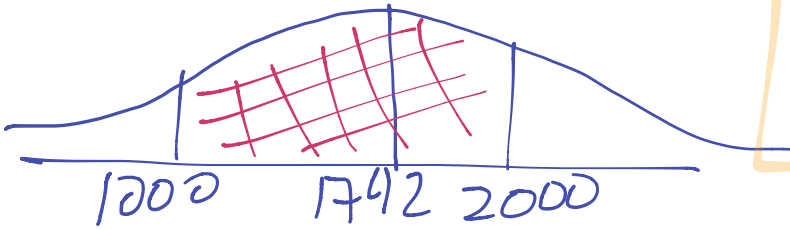
normalcdf (1000, 2000, 1742, 200)
= .9014

c) sent fewer than 1,500 messages?

normalcdf (-E99, 1500, 1742, 200)
= .1131
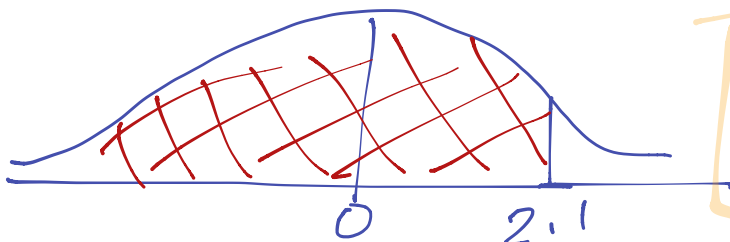
d) sent more than 2,000 messages?

normalcdf (2000, E99, 1742, 200)
= .0985

Source: New York Post, This Kid's a Text Maniac, http://www.nypost.com/seven/01112009/news/nationalnews/this_kids_a_text_maniac_149614.htm, 3/17/2009.

5. You get back an exam and your teacher says that the grades for all the sections were approximately normally distributed. If you got a z-score of 2.1, you did better than what proportion of the students taking the test?

$\bar{x} = 0$
$S = 1$

normalcdf (-E99, 2.1, 0, 1)
= .9821