Math 2311

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Office Hours: MW 11am to 12:45pm in 639 PGH

Online Thursdays 4-5:30pm

And by appointment

Class webpage: http://www.math.uh.edu/~bekki/Math2311.html

TEST 1 BEGINS THURSDAY 2/13!!!! MAKE SURE YOU HAVE REGISTERED AND RECORDED YOUR TIME. IF YOU ARE LATE, THEY WILL NOT ADMIT YOU.

Math 2311
Sections 4.1, 4.2 and Review for Test 1 (If you have more questions)

4.1 - Density Curves

A *density curve* is a graph whose area between it and the x-axis is equal to one. These graphs come is a variety of shapes but the most familiar "normal" graph is bell shaped. The area under the curve in a range of values indicates the proportion of values in that range.

Example: Thing about a density curve that consists of two line segments. The first goes from the point (0, 1) to the point (.4, 1). The second goes from (.4, 1) to (.8, 2) in the xy plane.

Sketch:

What percent of observations fall below .4?

What percent of observations lie between .4 and .8?

What percent of observations are equal to .4?

Example: Consider a uniform density curve defined from $x = 0$ to $x = 6$.
Sketch:

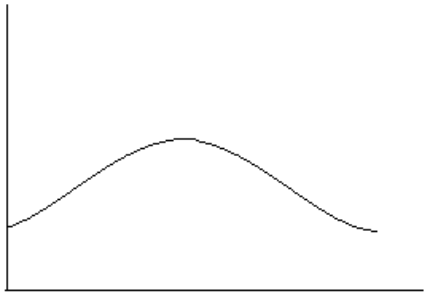
What percent of observations fall below 2?

What percent of observations lie between 2 and 3?

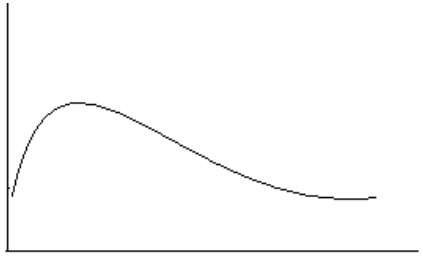
Find the median.

Skewness and curves:

Bell Shaped (normal)



Skewed Right



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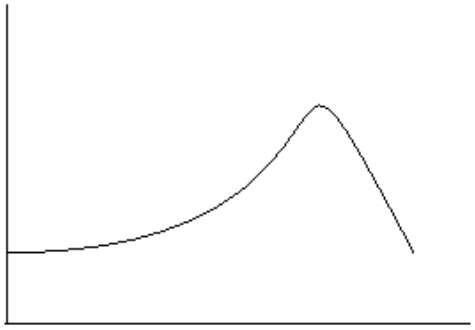


4.2 - The Normal Distribution

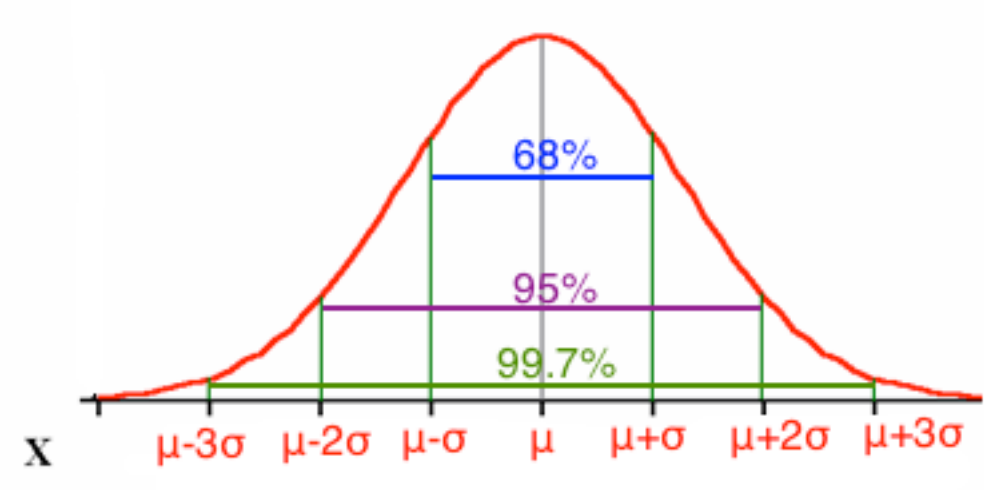
A density curve that is symmetric, single peaked and bell shaped is called a **normal distribution**.

The normal distribution with mean μ and standard deviation σ is represented by **N(μ, σ)**.

The Empirical Rule:

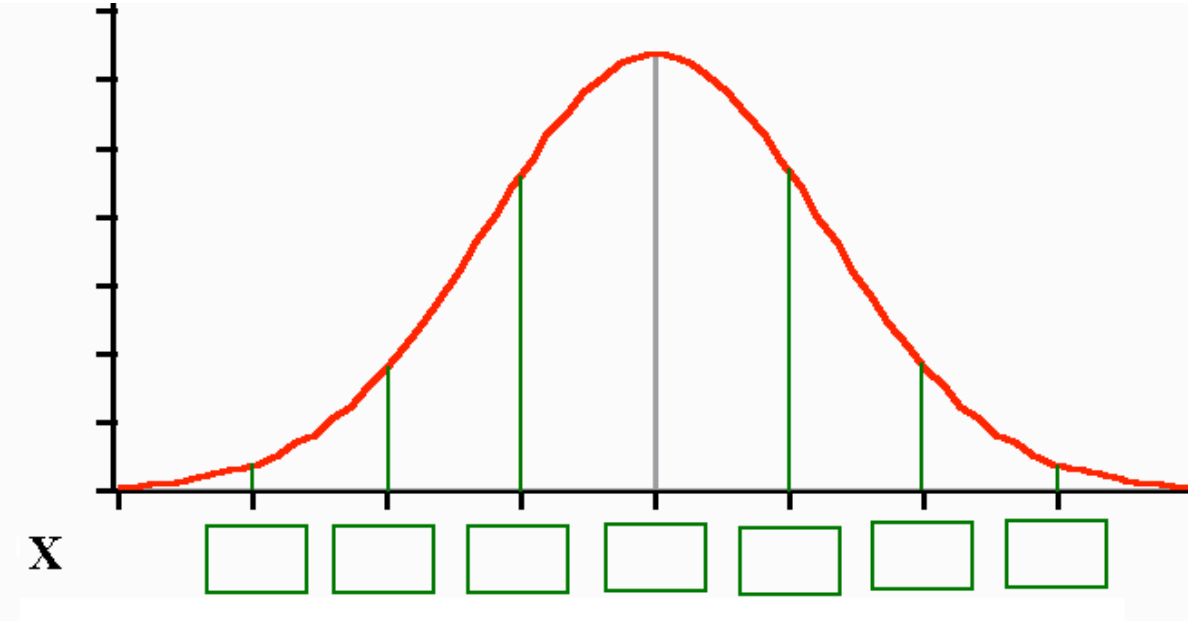
The Empirical Rule states if a distribution has a normal distribution,

1. Approximately 68% of all observations fall within one standard deviation of the mean.
2. Approximately 95% of all observations fall within two standard deviations of the mean.
3. Approximately 99.7% of all observations fall within three standard deviations of the mean.



Example:
The length of time needed to complete a certain test is normally distributed with mean 60 minutes and standard deviation 10 minutes.

What is the probability that someone will take between 40 and 80 minutes to complete the test? Sketch the distribution and shade in the area in question.



Find the interval that contains the middle 68% of completion times for all people taking the test.

What percent of people take more than 80 minutes to complete the test?

What if our values are not exactly within one, two or three standard deviations from the mean? Probabilities for these can still be found a number of ways, one of which we will explore in the next section. Using R, the probability can be found with the command pnorm(X, μ, σ). Note that the command in R only gives the probability that X is less than a given value. If we need to find the probability that X is greater than the given value, we will need to subtract the answer from 1.

With the TI-83 and TI-84 calculator, the command is

normalcdf(lower_limit, upper_limit, μ, σ).

Continuing the example above,
What is the probability that someone will take less than 45 minutes to complete the test?

What is the probability that someone will take more than 30 minutes to complete the test?

How long would it take someone to finish the test if they are in the top10% of the times?

ANY OTHER QUESTIONS OVER TEST 1 MATERIAL???????

Popper 06

1. If a group of students have test scores that are normally distributed with a mean of 82 and a standard deviation of 4, half of the students made below a grade of: