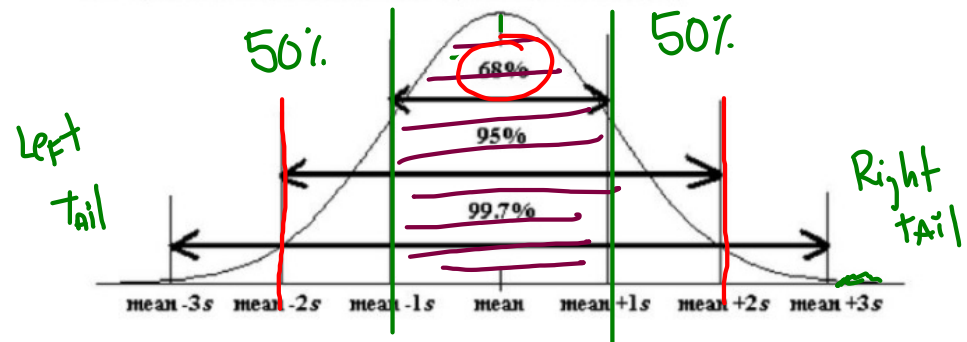
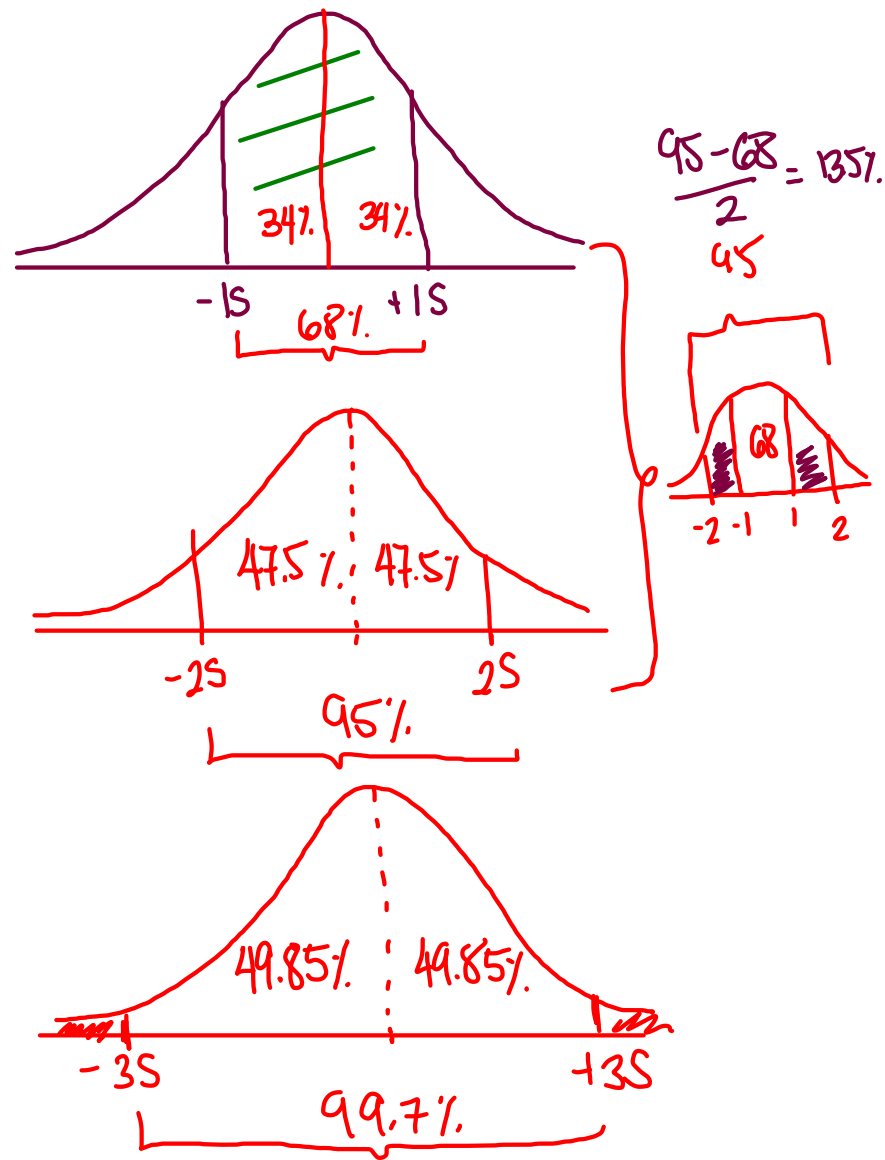


Empirical Rule : **NORMAL Distribution**

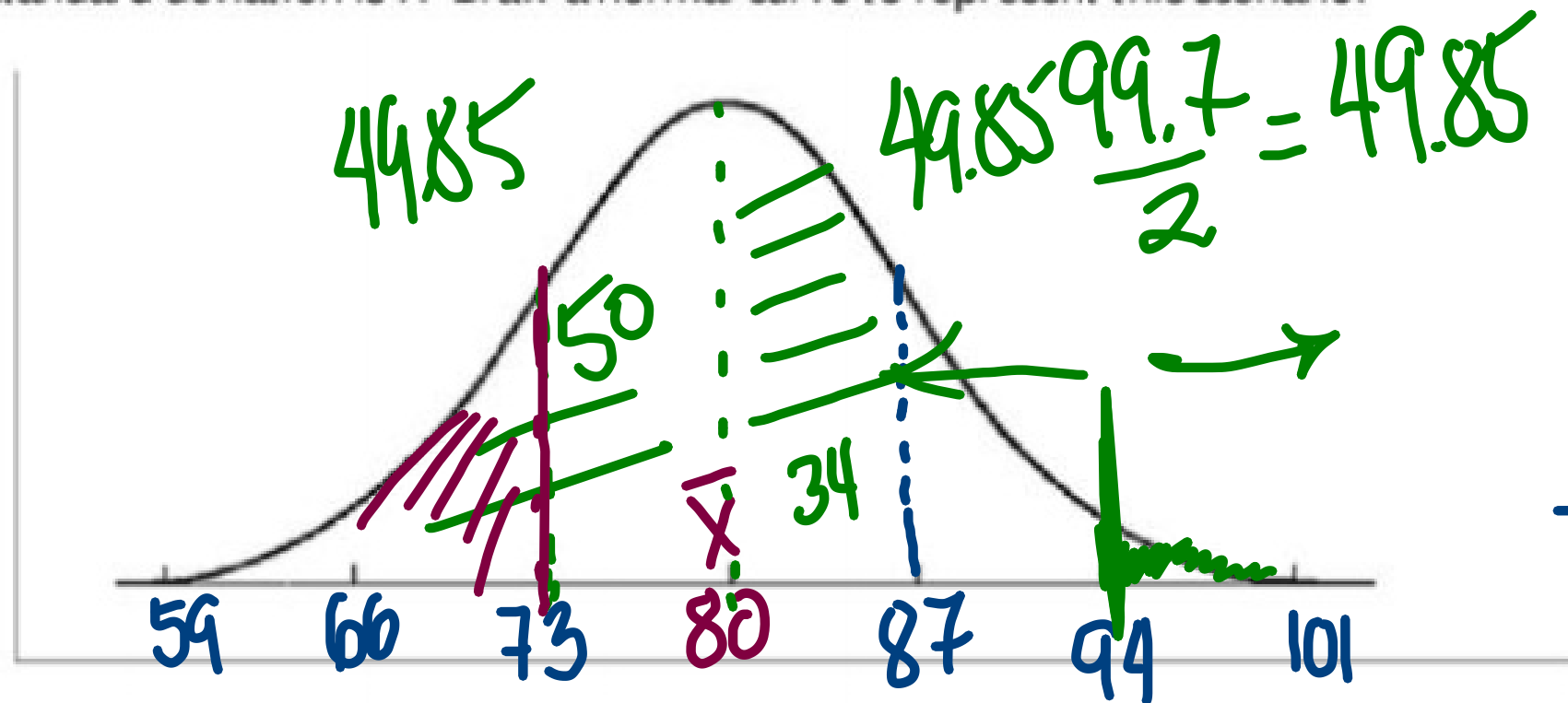
The Empirical Rule For Normal Distributions (a.k.a. the 68-95-99.7 Rule)



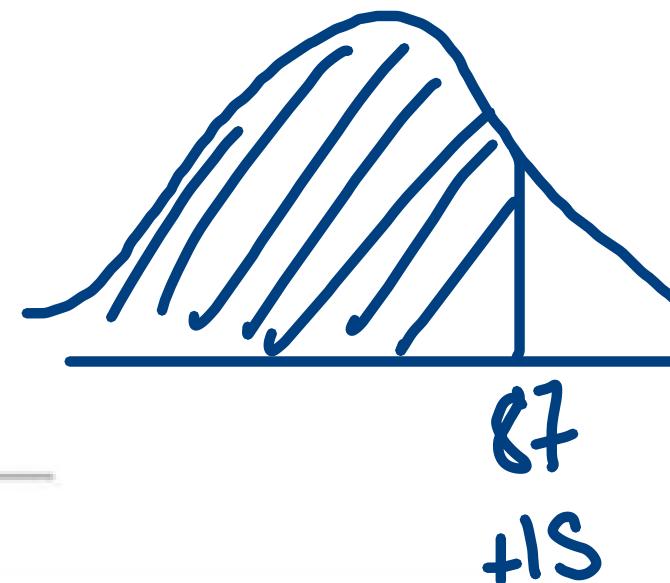
We use the Empirical Rule to analyze data when original values are unknown.



Example 1: Suppose the scores on a test are normally distributed, that the mean score is 80 and the standard deviation is 7. Draw a normal curve to represent this scenario.



$$S = 7$$



a. What percent scored less than 87?

$$50 + 34 = 84\%$$

b. What percent scored less than 73?

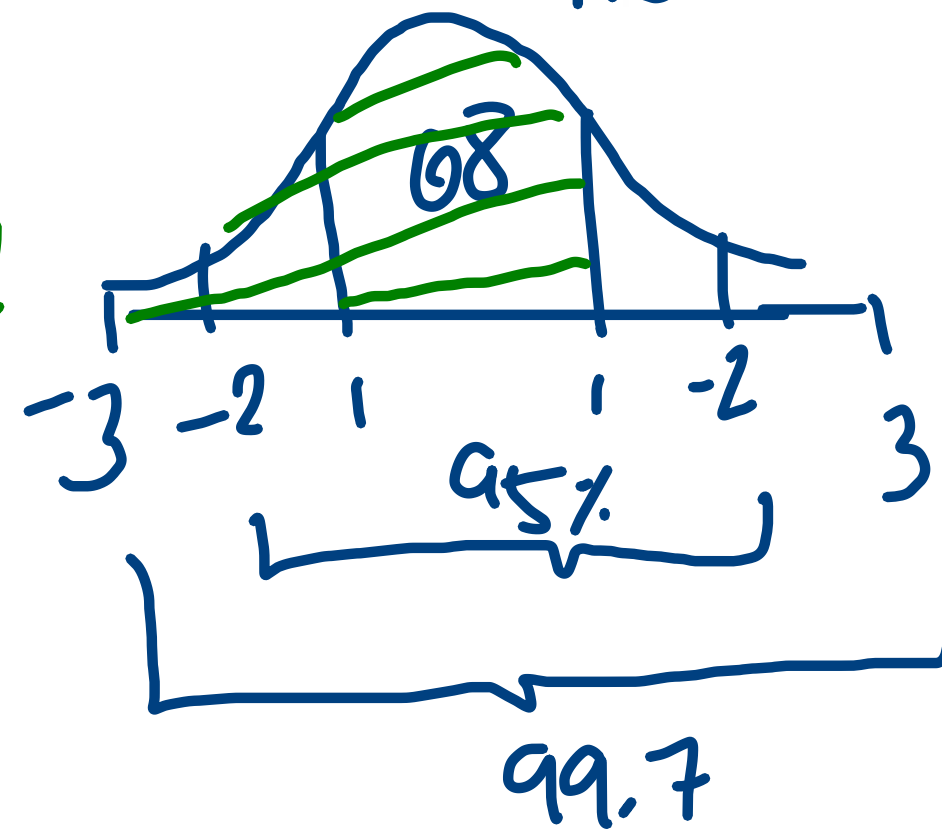
$$50 - 34 = 16\%$$

c. What percent scored more than 94?

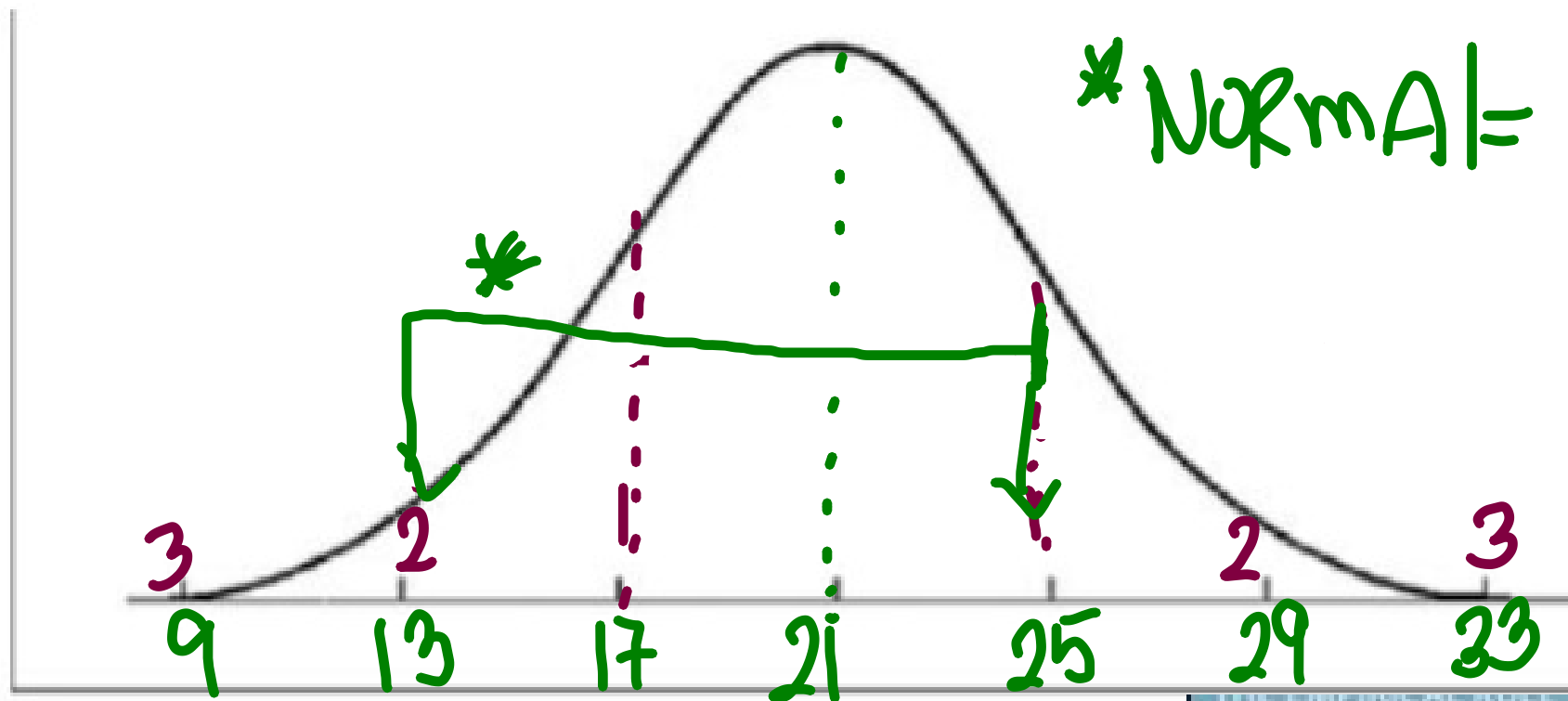
$$2.35 + 0.15 = 2.5\%$$

d. 2.5% scored less than what value?

Less than 94



Example 2: Given the times required for a group of students to complete the physical fitness obstacle course result in a normal curve, and that the mean time 21 minutes and the standard deviation is 4.



* Normal = within 2 stand. Deviation

USE this MODEL

a. What percent took longer than 29 minutes?

$$2.1 + 0.1 = 2.2\%$$

b. What percent took less than 29 minutes?

$$99.7 - 2.2 = 97.5\%$$

c. What percent took between 13 and 29 minutes?

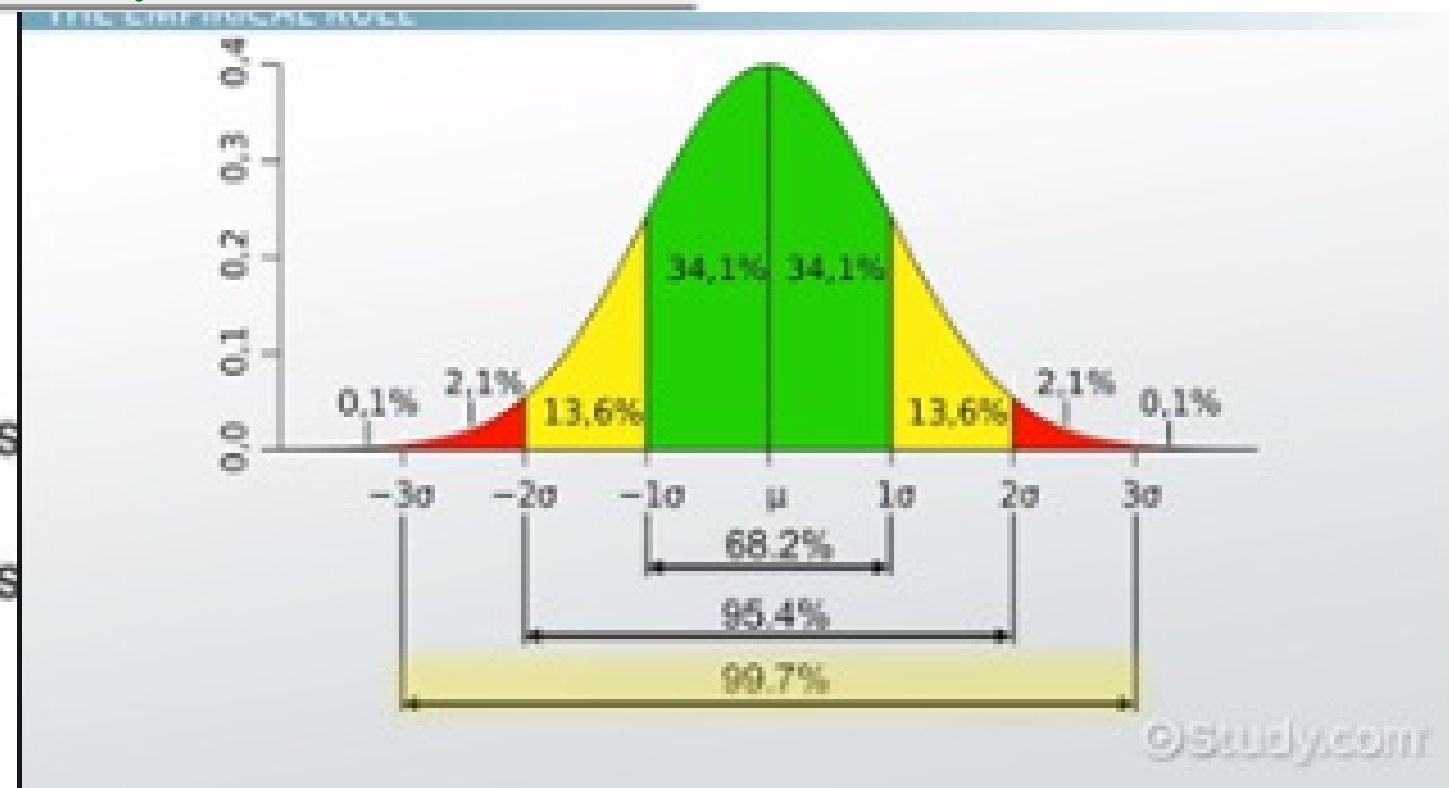
$$95.4\%$$

d. What percent took between 13 and 25 minutes?

$$13.6 + 34.1 + 34.1$$

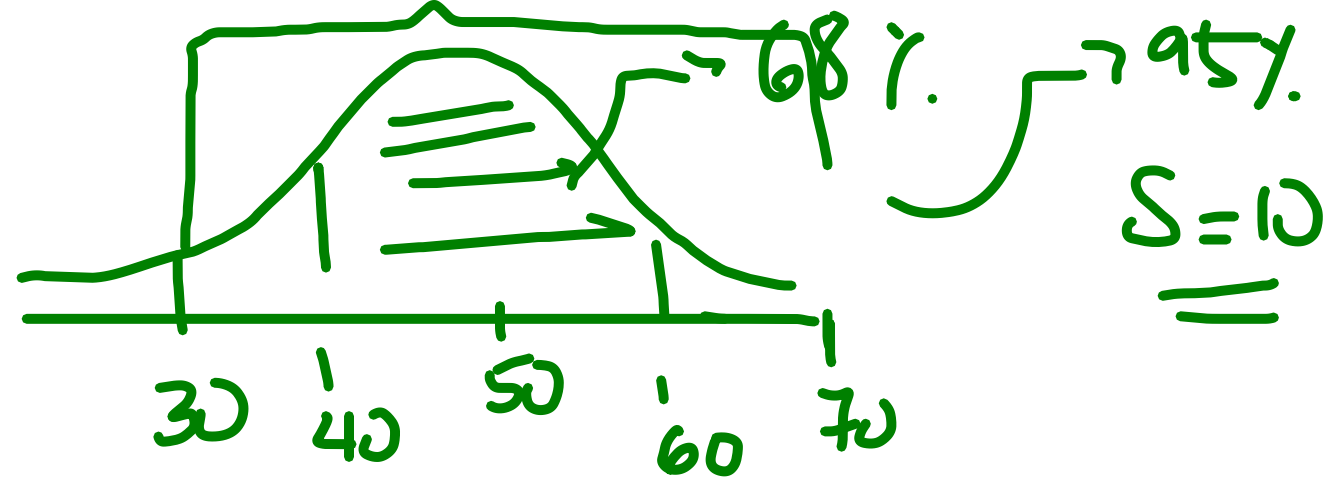
e. What percent took longer than 17 minutes?

$$34.1 + 34.1 + 13.6 + 2.1 + 0.1$$



II – Applications

Exercises



1. A set of data with a normal distribution has a mean of 50 and standard deviation of 10.

a. 68% of the data is between what two numbers?

$$40 - 60$$

b. 95% of the data is between what two numbers?

$$30 - 70$$

2. A set of data with a normal distribution has a mean of 35 and standard deviation of 5.

a. 68% of the data is between what two numbers?

$$30 - 40$$

b. 95% of the data is between what two numbers?

$$25 - 45$$

c. About what percent of the population (data) is above 40?

$$2.5\%$$

