PSC 202

SYRACUSE UNIVERSITY

INTRODUCTION TO POLITICAL ANALYSIS

EXAM REVIEW, MORE SAMPLING AND SURVEYS

SURVEY

- Take it if you haven’t yet!
- Response rate: 80%
  - Need 85% to get extra credit for whole class
- rebrand.ly/202survey

STUDENT HOURS

- Next Monday: 9-11
- 530 Eggers or Zoom
  - Zoom info on syllabus

TODAY

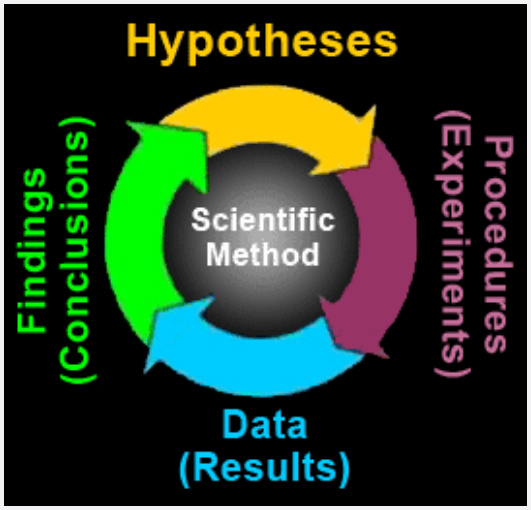
- A bit more on dispersion
- Exam review
- More on sampling and surveys

TODAY

- A bit more on dispersion
- Exam review
- More on sampling and surveys

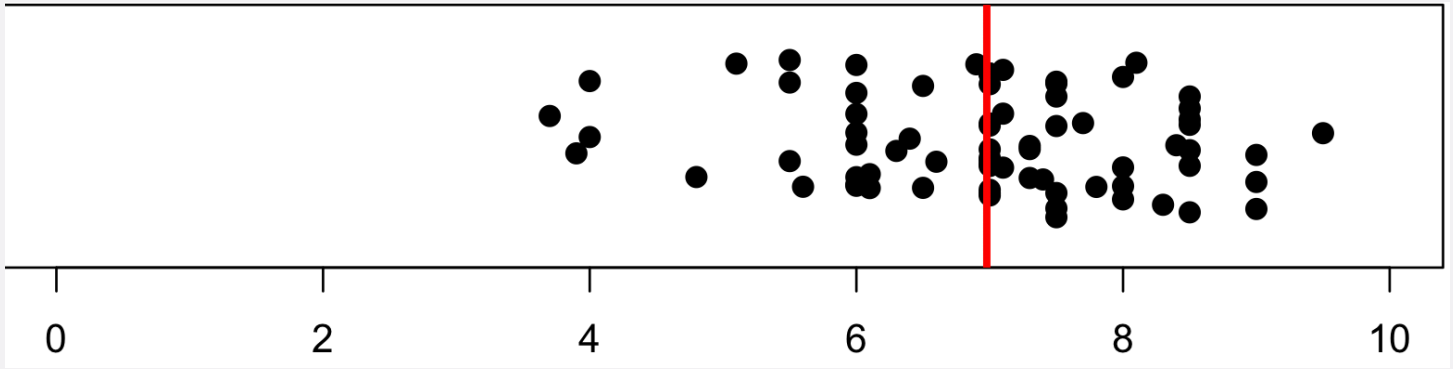
WHERE WE ARE

- Formulate research question
- Propose explanation/theory, hypotheses
- Data collection process
- Use data to evaluate hypotheses
- Reassess explanation



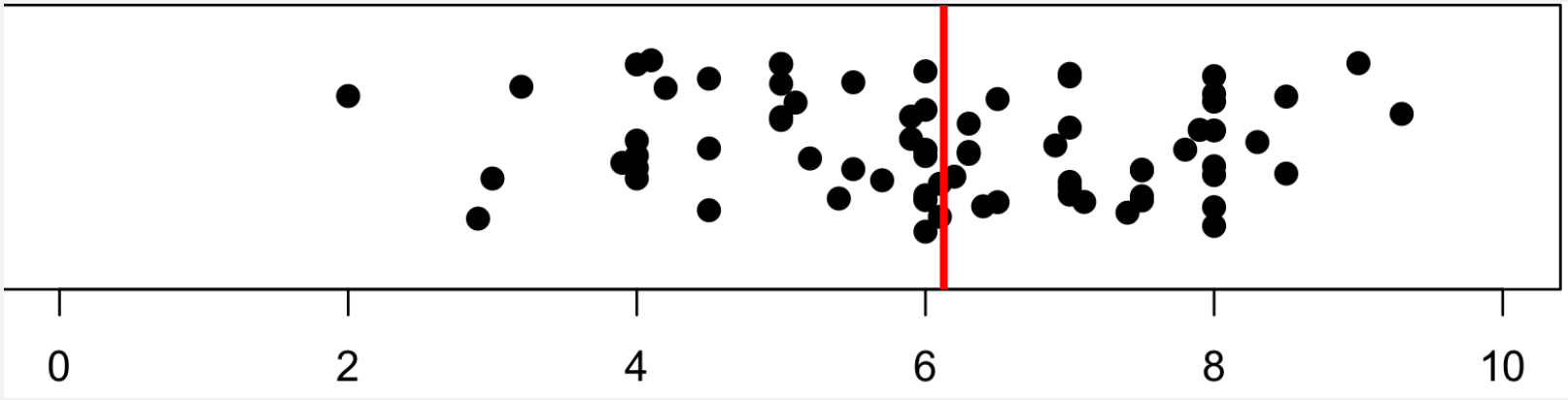
DISPERSION

- How many hours to you sleep at night?
  - Regular week:



Mean: 7.0; Standard deviation: 1.24

  - Finals week:



Mean: 6.1; Standard deviation: 1.58

DISPERSION?

- **The actions and policies of Syracuse University are effective at controlling Covid-19**

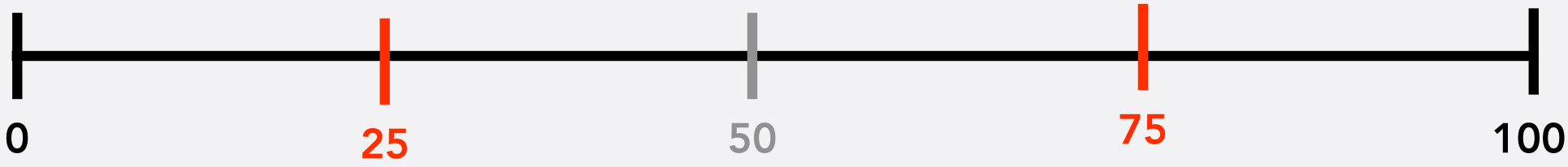
	Number	Percentage	Cumulative Percentage
Strongly agree	8	10.8	10.8
Somewhat agree	35	47.3	58.1
Neither agree nor disagree	7	9.5	67.6
Somewhat disagree	17	23.0	90.6
Strongly disagree	7	9.5	100.1

DISPERSION

- Standard deviation only works for interval-level variables
  - Here: Ordinal-level variable
- Dispersion measure: Interquartile range
  - Look at value at 25th percentile and value at 75th percentile

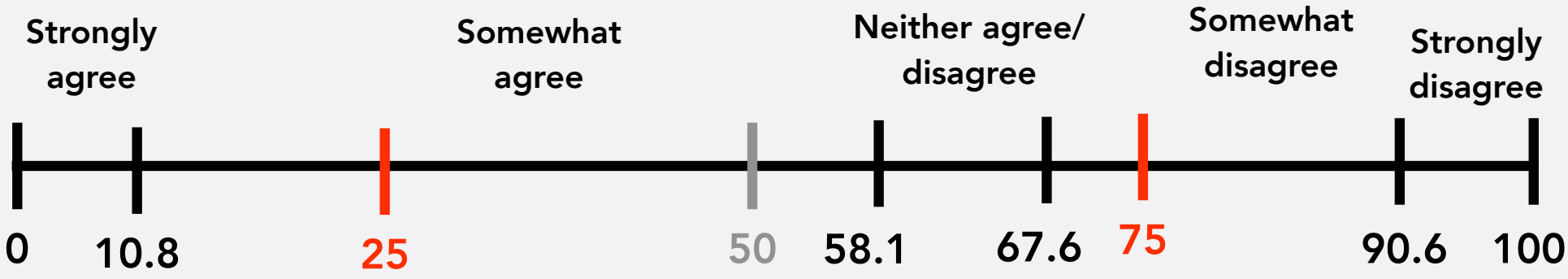
INTERQUARTILE RANGE

- The actions and policies of Syracuse University are effective at controlling Covid-19



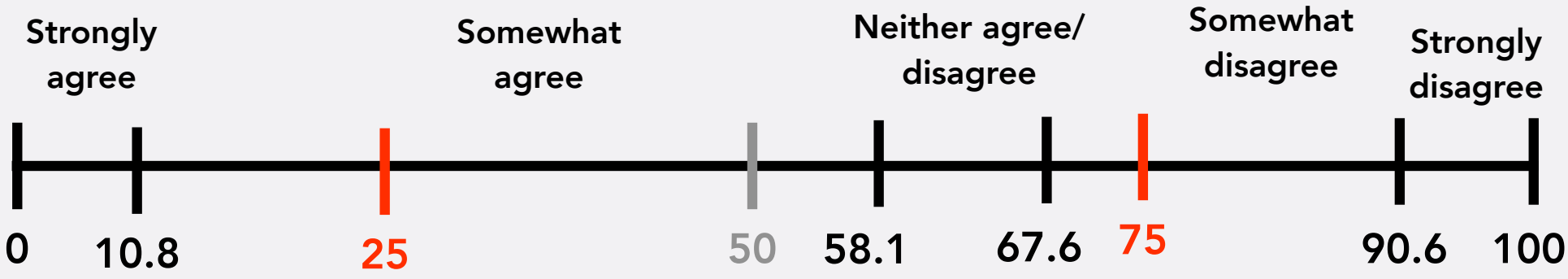
INTERQUARTILE RANGE

- The actions and policies of Syracuse University are effective at controlling Covid-19



INTERQUARTILE RANGE

- The actions and policies of Syracuse University are effective at controlling Covid-19



- 25th percentile: somewhat agree
- 75th percentile: somewhat disagree

INTERQUARTILE RANGE

	Number	Percentage	Cumulative Percentage
Strongly agree	8	10.8	10.8
Somewhat agree	35	47.3	58.1
Neither agree nor disagree	7	9.5	67.6
Somewhat disagree	17	23.0	90.6
Strongly disagree	7	9.5	100.1

- Category whose cumulative percentage includes 25%?

INTERQUARTILE RANGE

	Number	Percentage	Cumulative Percentage
Strongly agree	8	10.8	10.8
25th Somewhat agree	35	47.3	58.1
Neither agree nor disagree	7	9.5	67.6
Somewhat disagree	17	23.0	90.6
Strongly disagree	7	9.5	100.1

- Category whose cumulative percentage includes 75%?

INTERQUARTILE RANGE

	Number	Percentage	Cumulative Percentage
Strongly agree	8	10.8	10.8
25th Somewhat agree	35	47.3	58.1
Neither agree nor disagree	7	9.5	67.6
Somewhat disagree	17	23.0	90.6
75th Strongly disagree	7	9.5	100.1

INTERQUARTILE RANGE

- Interquartile range
  - 25th percentile: “somewhat agree”
  - 75th percentile: “somewhat disagree”
- Works for ordinal and interval-level variables
  - and can be interpreted in intuitive way

NOMINAL-LEVEL

Party Affiliation	Number	Percentage
Democrat	49	66.2
Republican	6	8.1
Independent	12	16.2
Other	3	4.1
None	4	5.4

- No dispersion measure, since we can't rank observations

DESCRIBING VARIABLES

- There are different types of variables
  - Nominal, Ordinal, Interval
- Central tendency
  - Mode (N, O, I), median (O, I), mean (I)
- Dispersion
  - Standard deviation (I), interquartile range (O, I)

TODAY

- A bit more on dispersion
- Exam review
- More on sampling and surveys

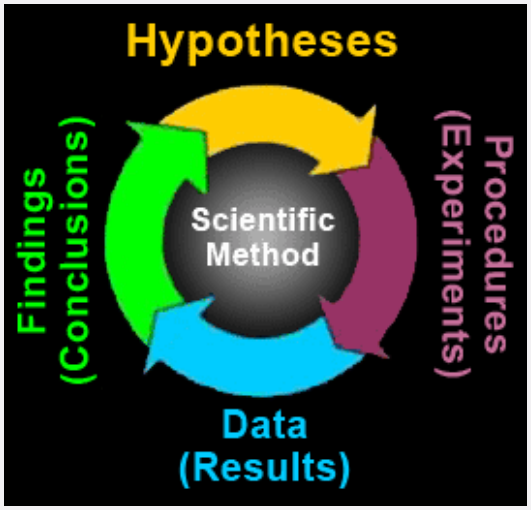
EXAM

- Monday: Exam #1
  - Bring a calculator (no phone etc.)
  - Formulas will be given on exam, no need to memorize
- If you take exam at ODS, please sign up now!

- No new problem set this week

RESEARCH PROCESS

- Formulate research question
- Propose explanation/theory, hypotheses
- Data collection process
- Use data to evaluate hypotheses
- Reassess explanation



STUDY GUIDE

- Formulating a research question
  - What are characteristics of good/bad research questions?
  - Be able to evaluate a research question
  - Be able to come up with good research questions

STUDY GUIDE

- Developing a theory
  - What is the goal of a theory?
  - Dependent and independent variable
  - What are the characteristics of a good/bad theory?
  - Be able to evaluate a theory
  - Be able to come up with good theories

STUDY GUIDE

- Measurement process
  - What are the steps in the measurement process?
  - Conceptual definitions
    - concepts, unit of analysis, definition
    - be able to identify good/bad conceptual definitions, be able to come up with a good conceptual definition
  - Operational definitions
    - be able to identify good/bad operational definitions, be able to come up with a good operational definition
  - Measurement issues
    - reliability and validity

UNIT OF ANALYSIS

- Entity we want to describe: “unit of analysis”
  - Individuals, countries, regions etc.

STUDY GUIDE

- Variables
  - Variable labels and values
  - Measurement levels
    - nominal, ordinal, interval
  - Central tendency
    - mode, median, mean
  - Dispersion
    - interquartile range, standard deviation

STUDY GUIDE

- Sampling
  - Population and sample
  - Random sampling
    - Why is it a good idea and what problems does it create?
  - Not covered in this exam: New material on sampling and surveys we cover today

EXAM

- **Important in exam: Show your steps!**

EXAM

- Questions?

TODAY

- A bit more on dispersion
- Exam review
- More on sampling and surveys

RECAP

- Population: the entire universe of objects to which our hypothesis applies
- Sample: the subset of the population that we study in order to make inferences about the full population

- A random sample of the population avoids *systematic* sampling error
  - but it does have *random* sampling error

RECAP

POLITICS SEPTEMBER 22, 2021

Biden's Approval Rating Hits New Low of 43%; Harris' Is 49%

Results for this Gallup poll are based on telephone interviews conducted Sept. 1-17, 2021, with a random sample of 1,005 adults, aged 18 and older, living in all 50 U.S. states and the District of Columbia. For results based on the total sample of national adults, the margin of sampling error is ±4 percentage points at the 95% confidence level. All reported margins of sampling error include computed design effects for weighting.

- **How confident can we be that the 43% approval rating among 1,005 respondents is close to the approval rating of *all* American voters?**

RECAP

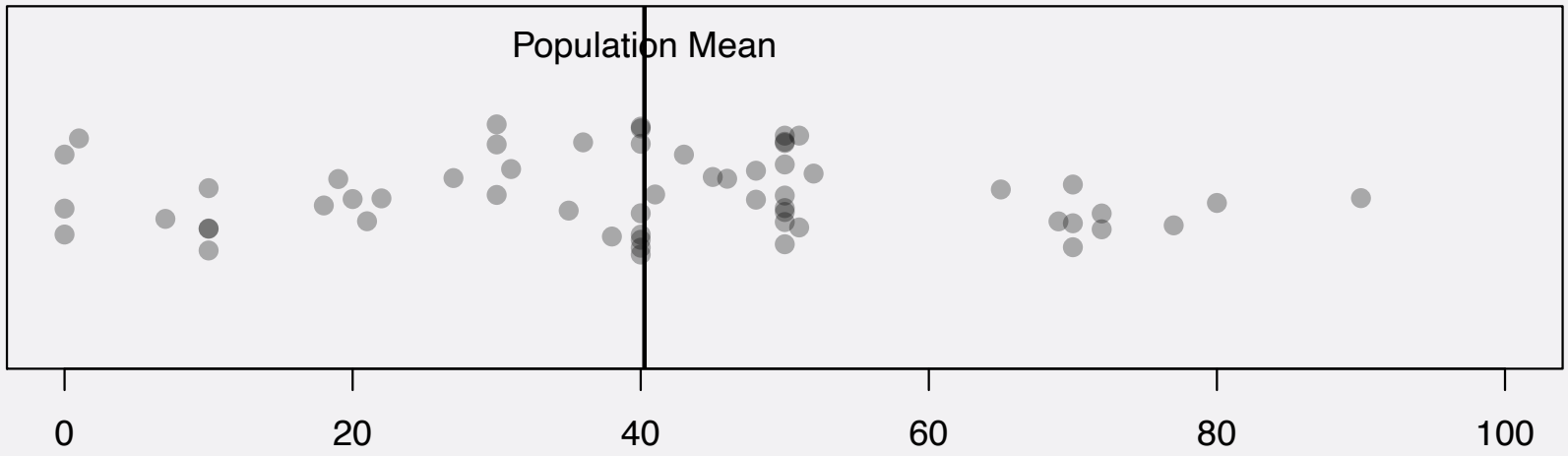
Unknown: Approval rating in population

Known: Approval rating in survey

- Population parameter = Sample statistic + random sampling error

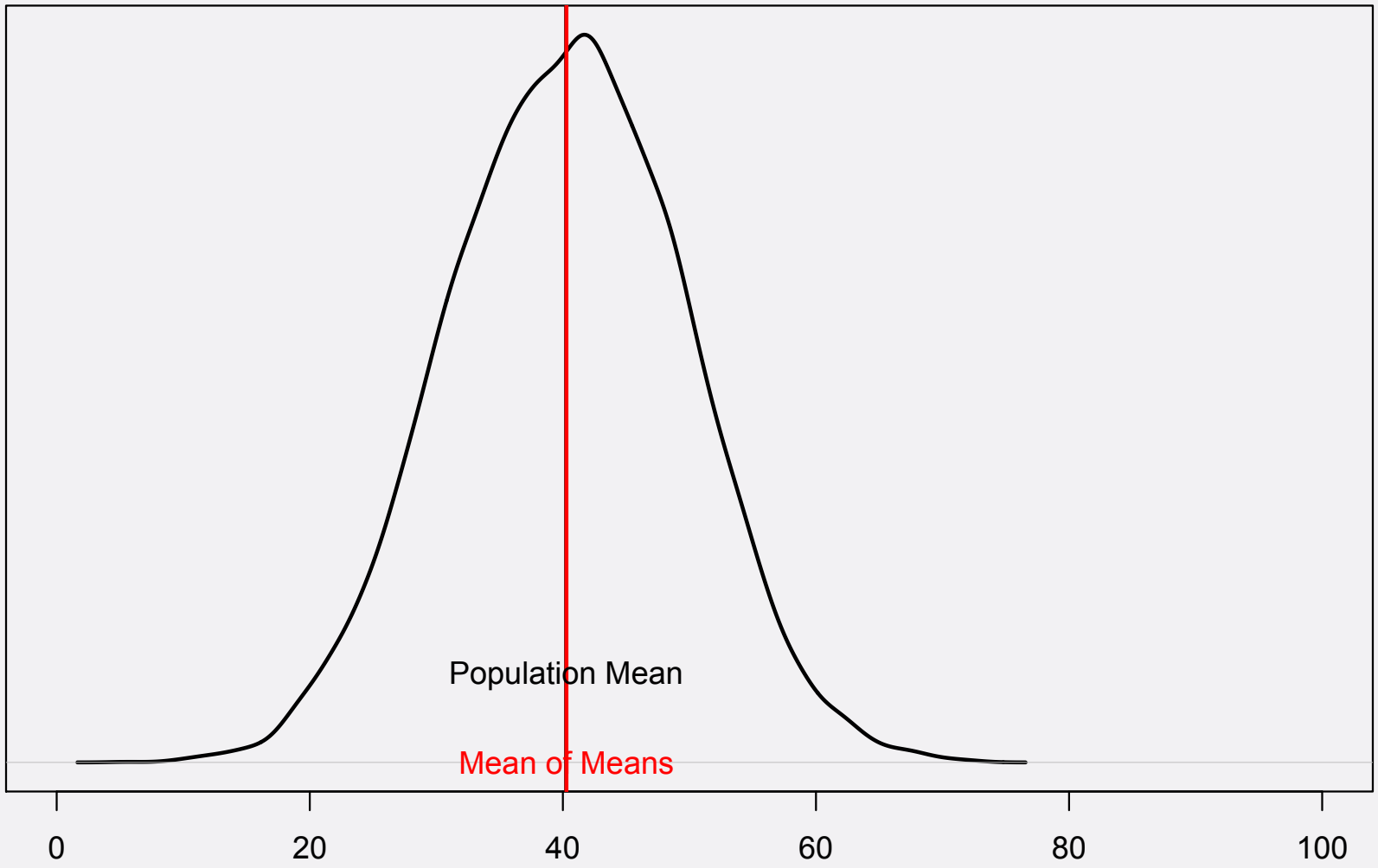
We can figure this out

OUR SURVEY



- Took random sample of 5 students
- Record average rating of those 5 students
- Do this thousands of times

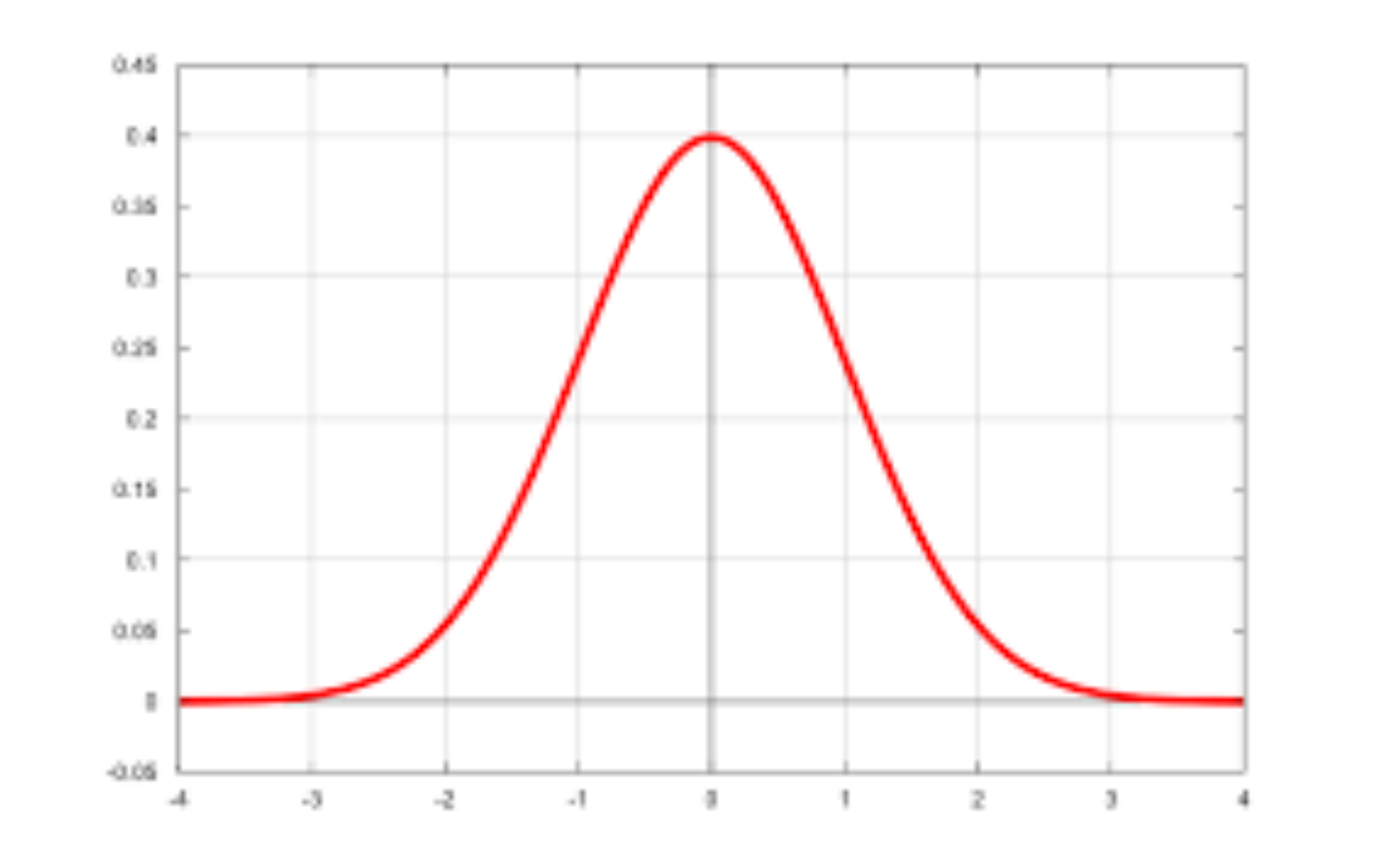
AFTER 10,000 RANDOM SAMPLES



CENTRAL LIMIT THEOREM

- If we take many random samples from a population and compute the sample mean for each sample…
  - The sample means will have a normal distribution
  - The mean of the sample means will be equal to the population mean
  - The standard deviation (=dispersion) of the distribution of sample means tells us something about the amount of random measurement error

INTERLUDE

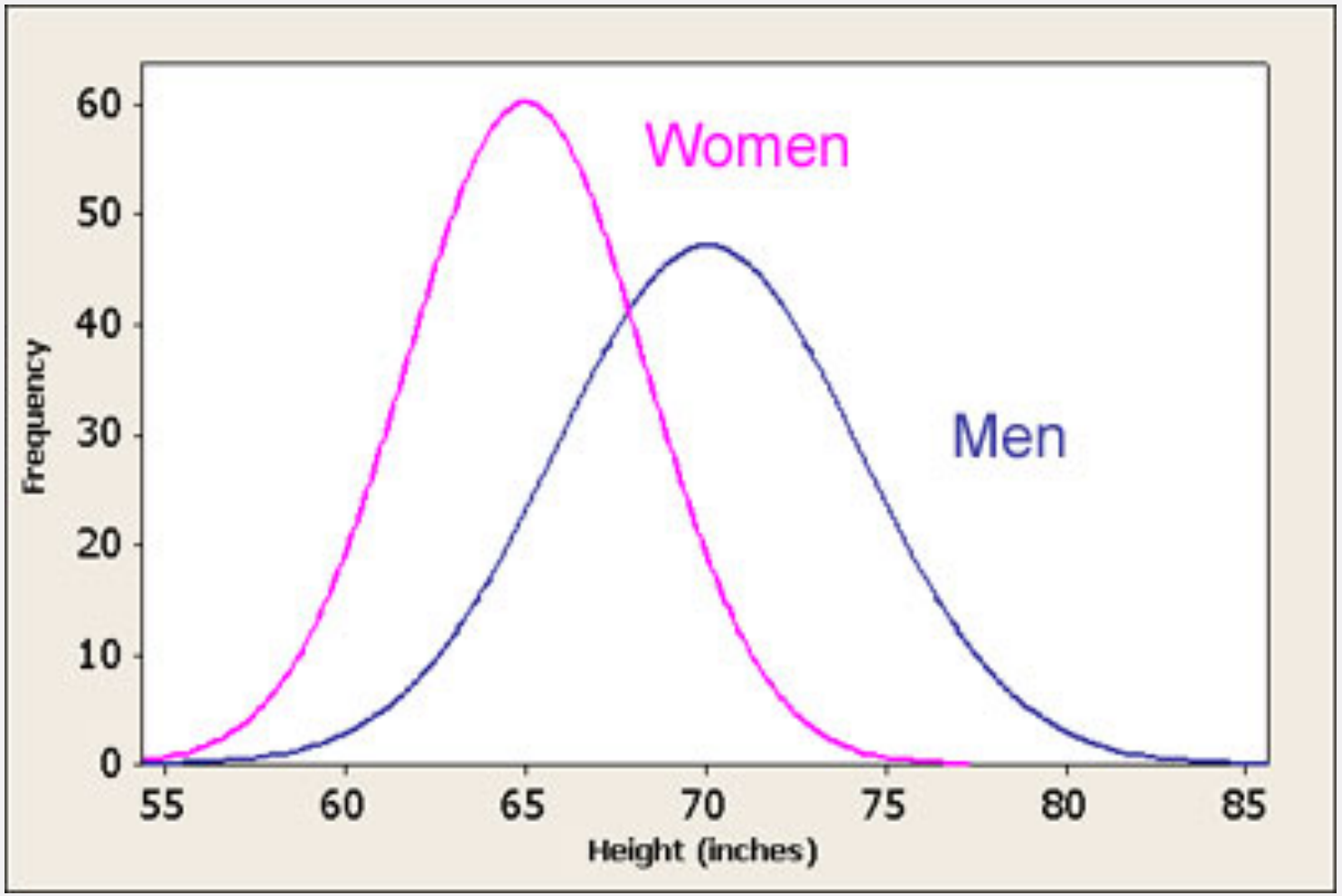


- You'll need to know about the normal distribution

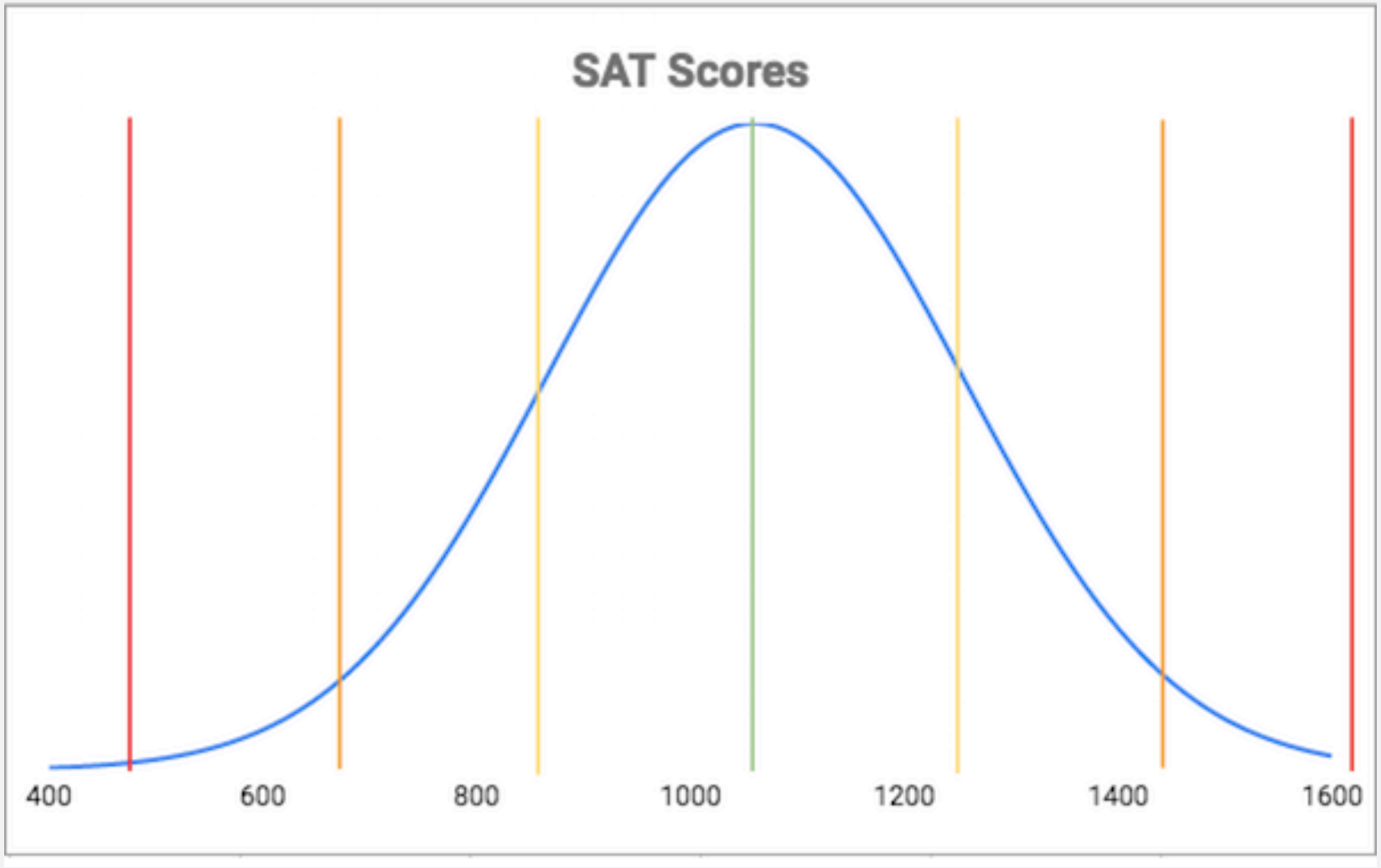
NORMAL DISTRIBUTION

- Data cluster around the mean in a symmetric manner
- Density of the data decreases when moving away from the mean, making the “bell curve”
- Many variables are normally distributed, e.g. height

NORMAL DISTRIBUTION



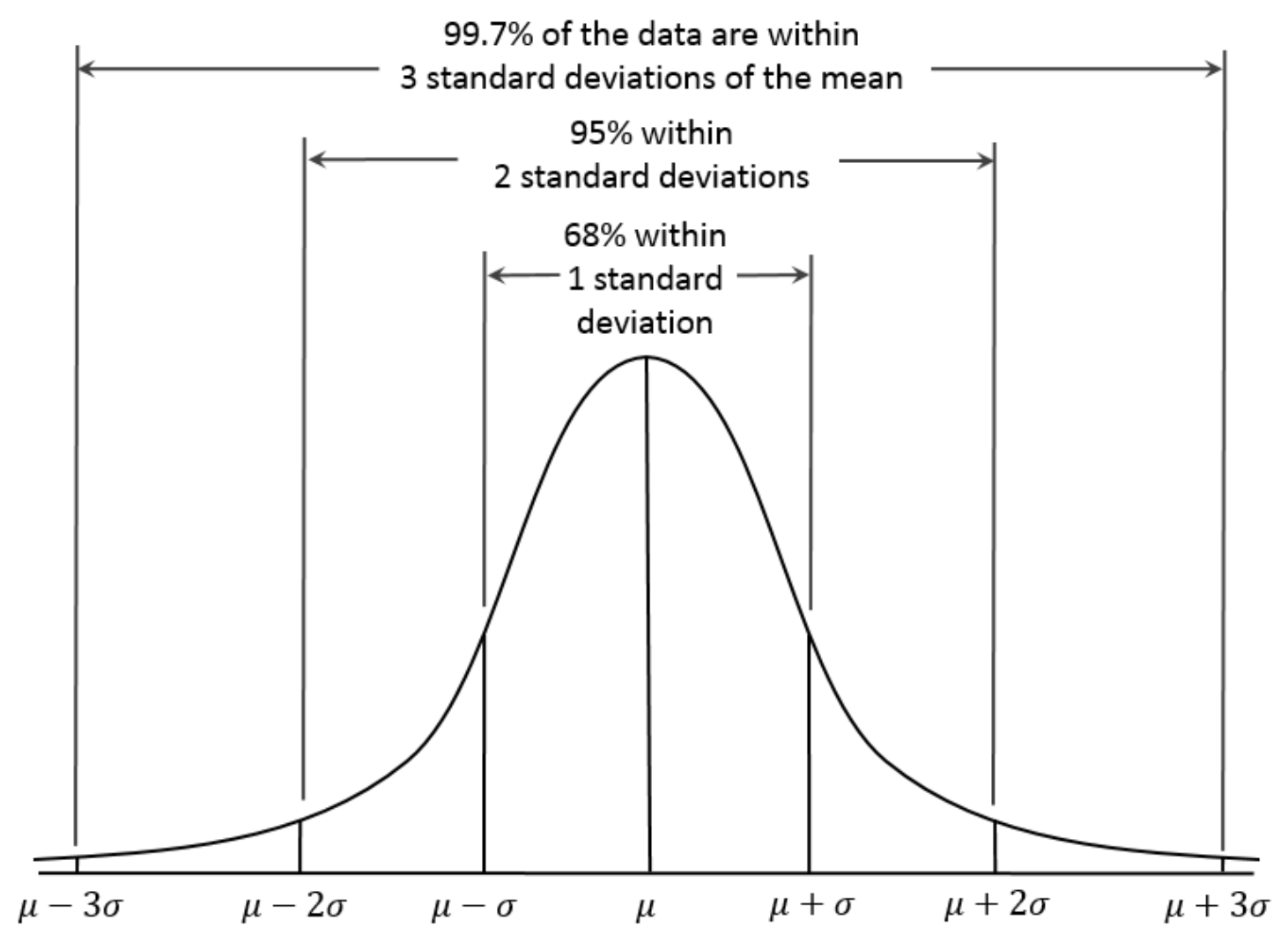
NORMAL DISTRIBUTION



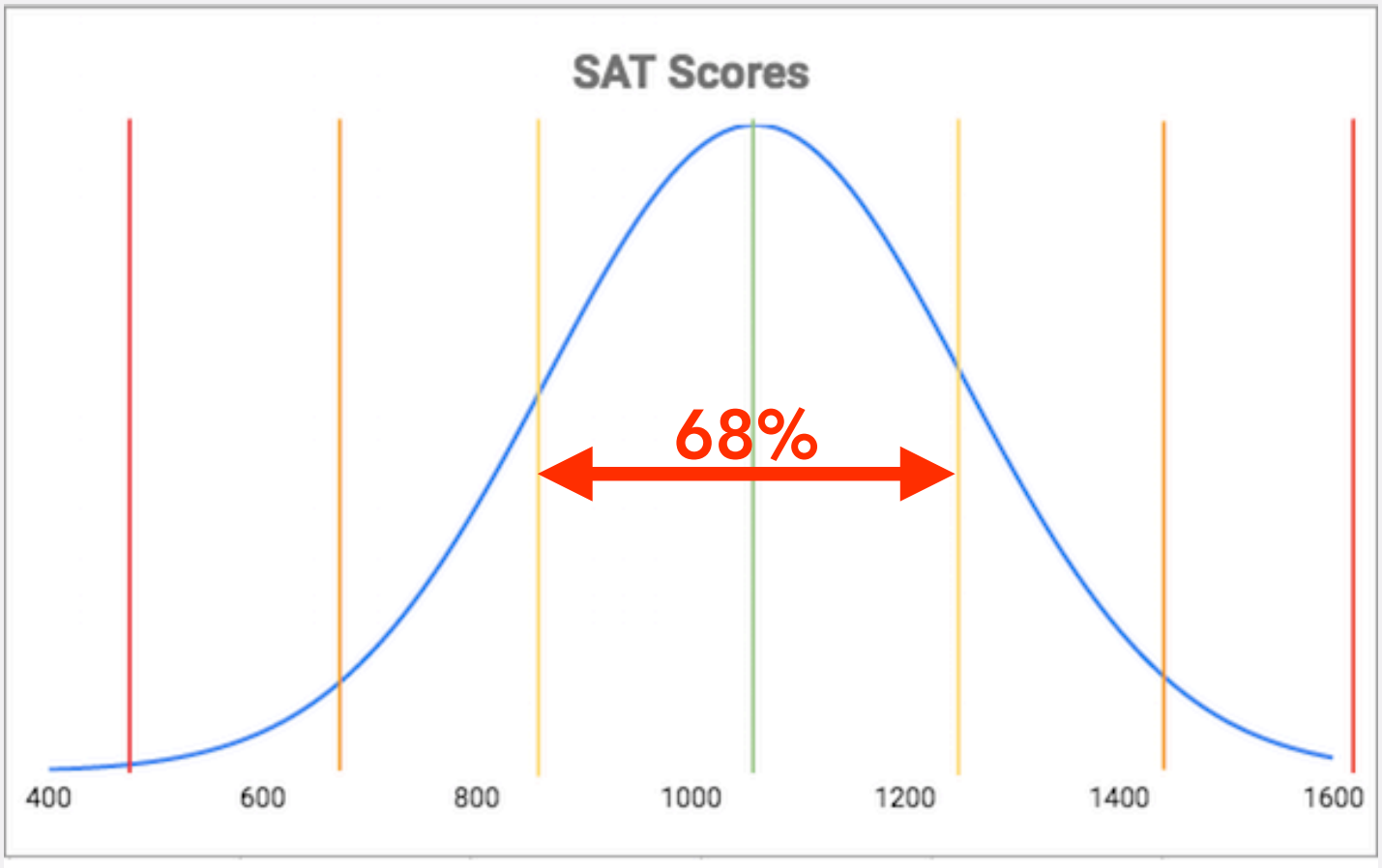
- **Mean: 1060**
- **Standard deviation: 195**

NORMAL DISTRIBUTION

- Important characteristic of *all* Normal distributions:

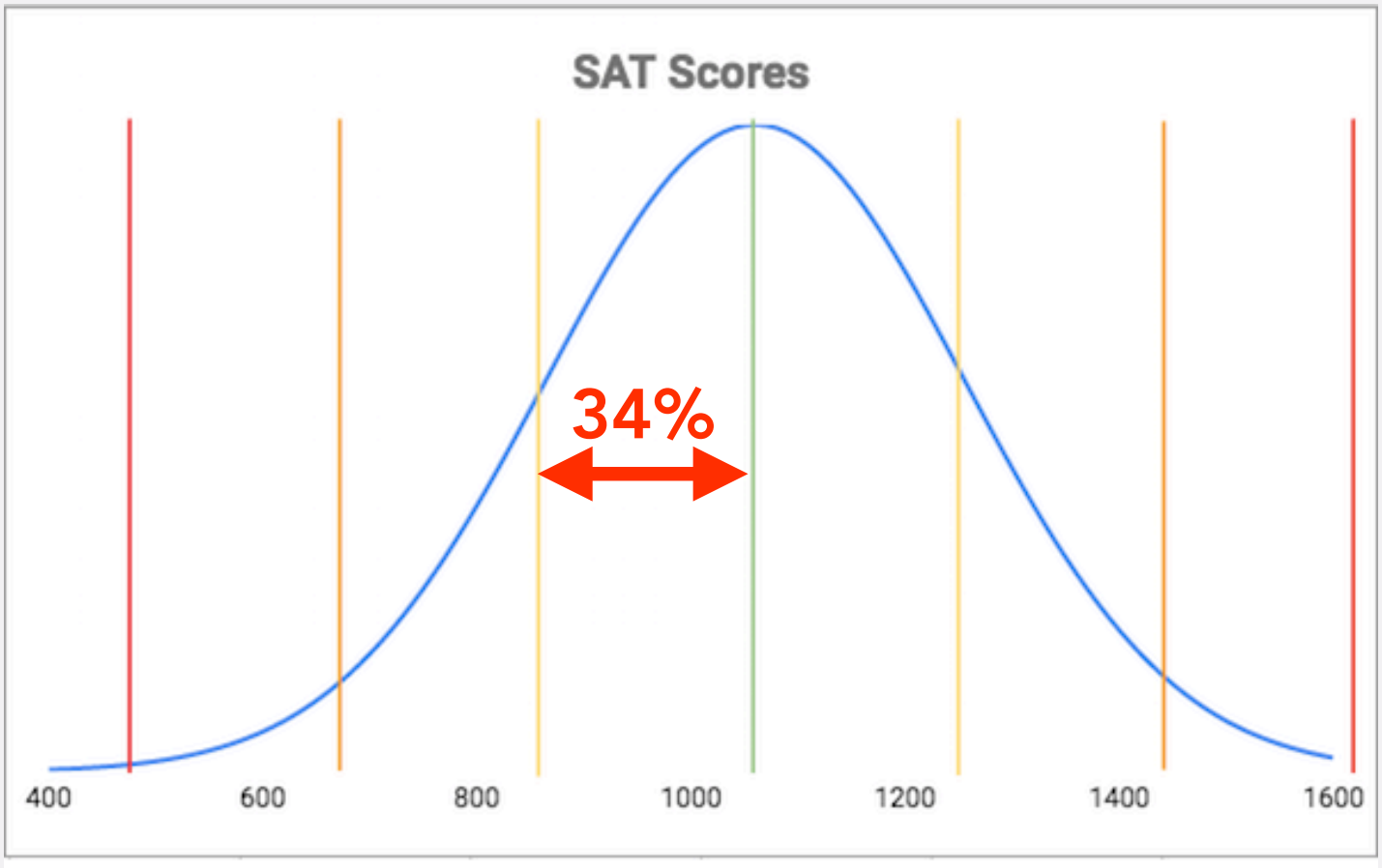


NORMAL DISTRIBUTION



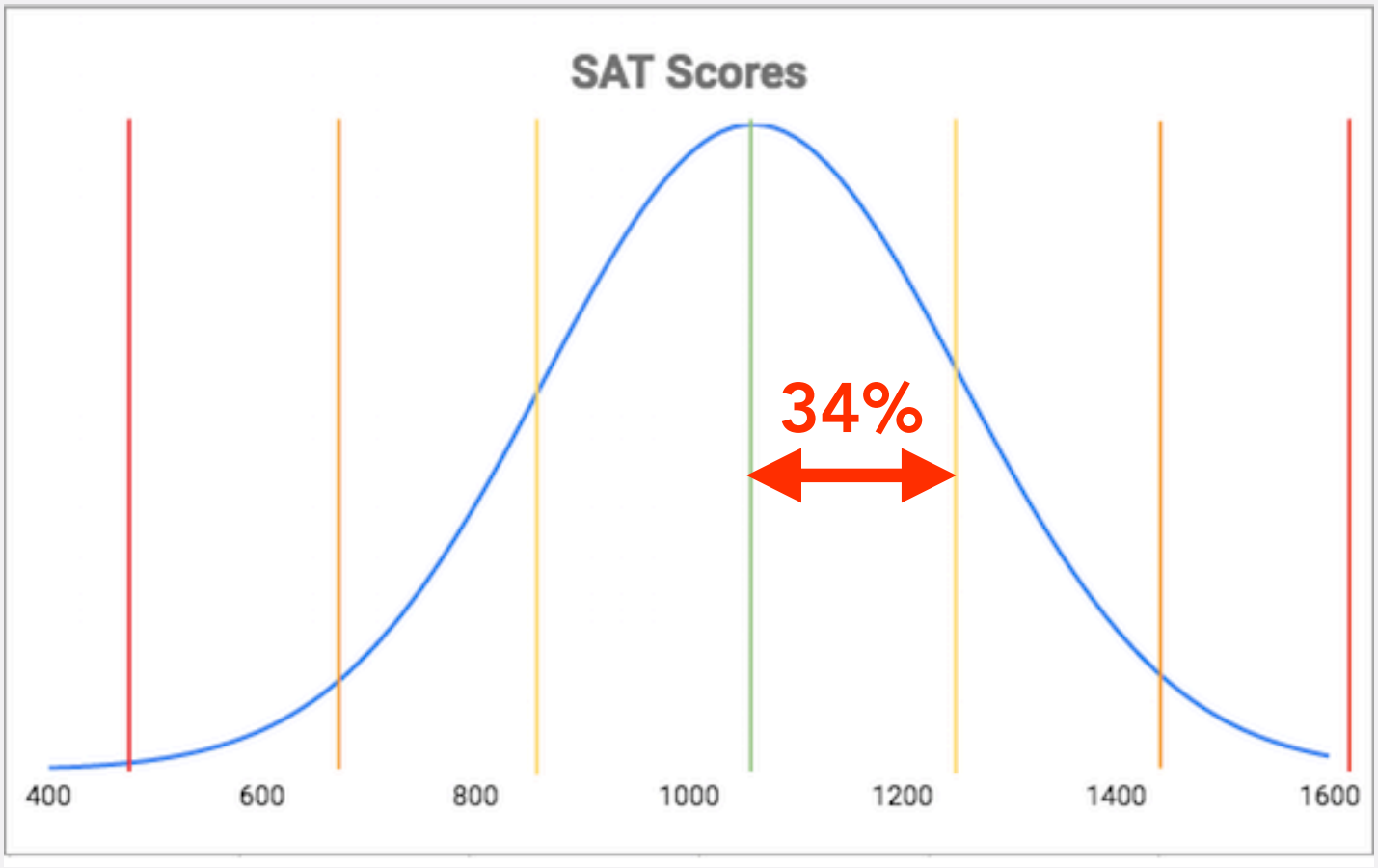
- Mean: 1060; Standard deviation: 195
- So: 68% of SAT scores between 1060-195 and 1060+195 (865-1255)

NORMAL DISTRIBUTION



- Mean: 1060; Standard deviation: 195
- So: 34% of SAT scores between 1060-195 and 1060 (865-1060)

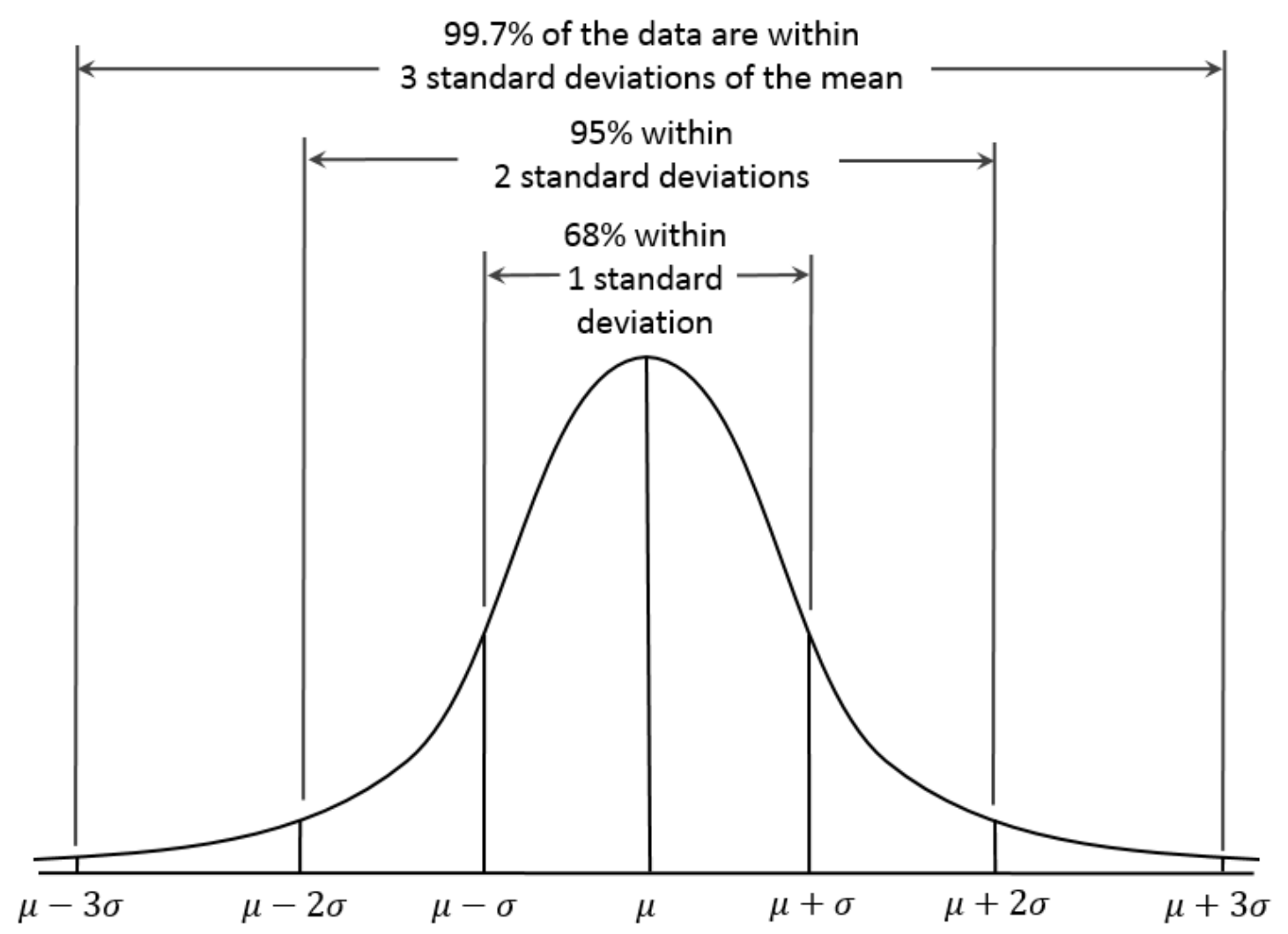
NORMAL DISTRIBUTION



- Mean: 1060; Standard deviation: 195
- So: 34% of SAT scores between 1060 and 1060+195 (1060-1255)

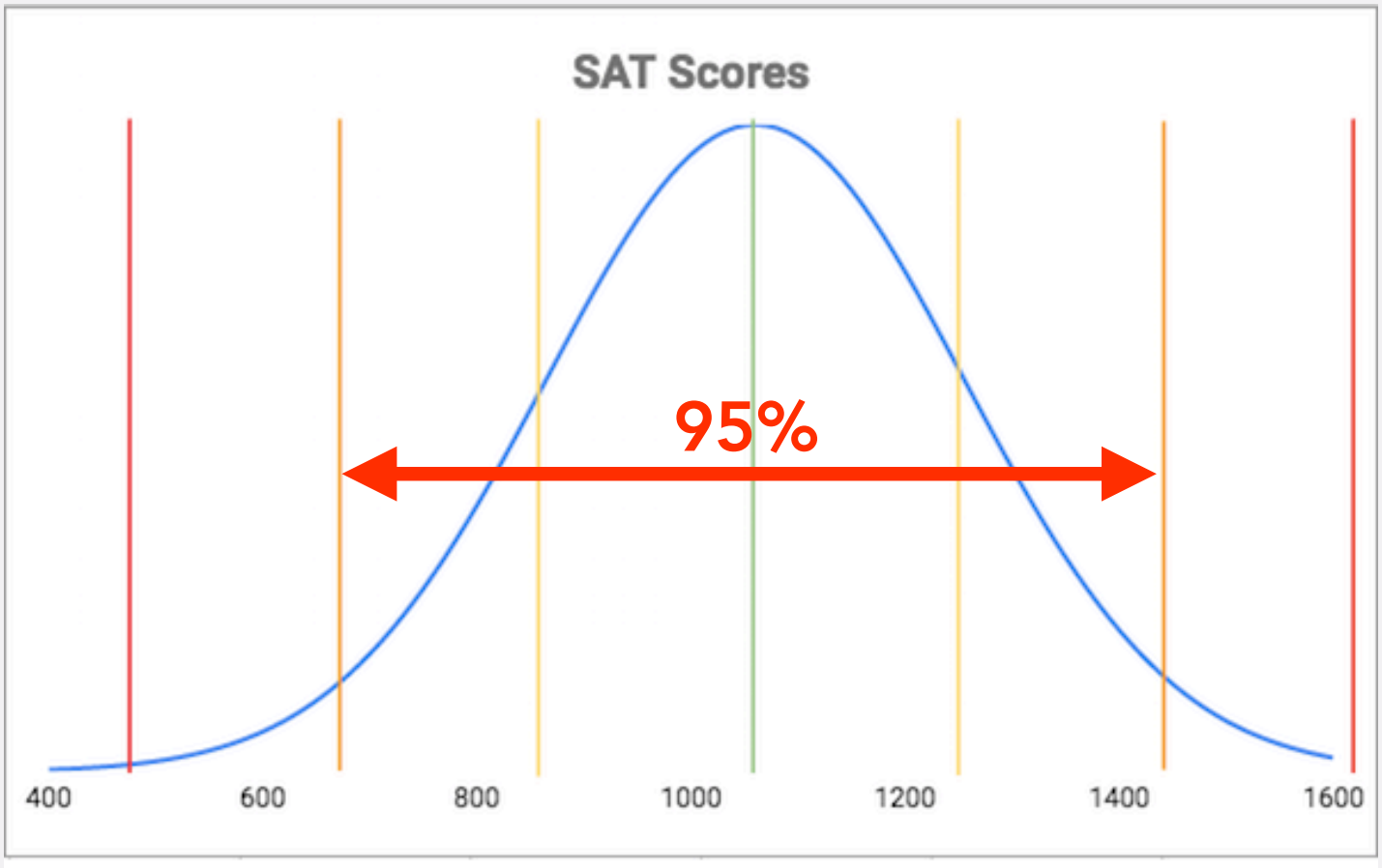
NORMAL DISTRIBUTION

- Important characteristic of *all* Normal distributions:



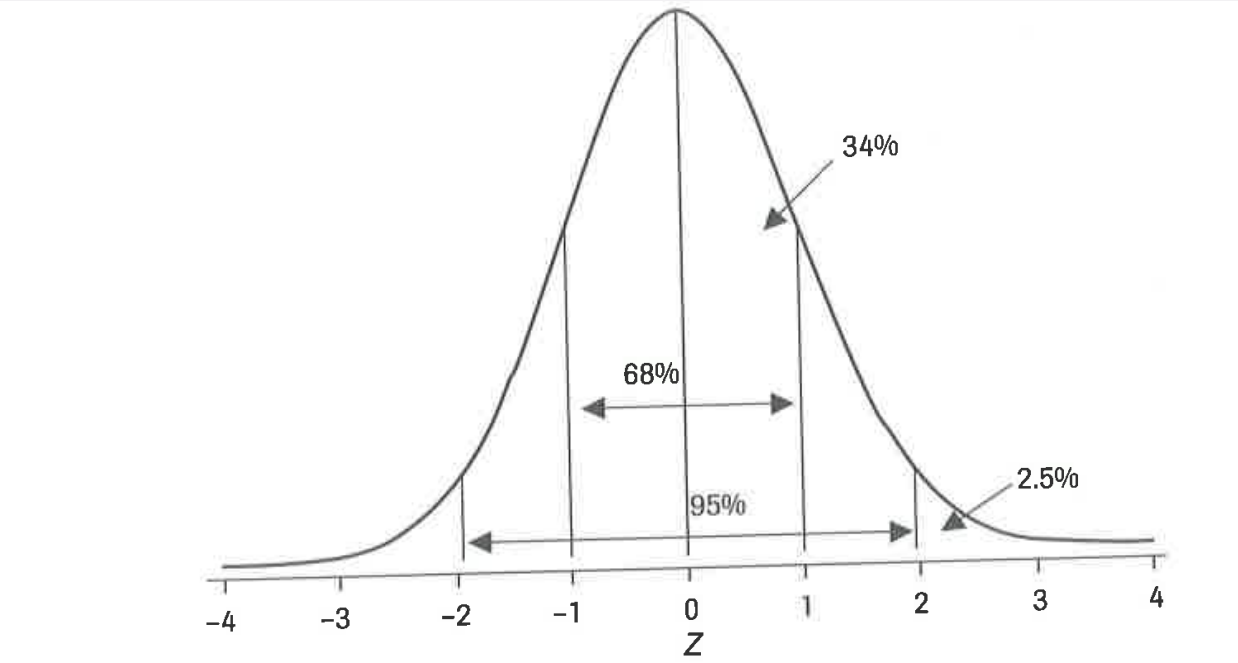
- Actually: 95% within 1.96 standard deviations

NORMAL DISTRIBUTION



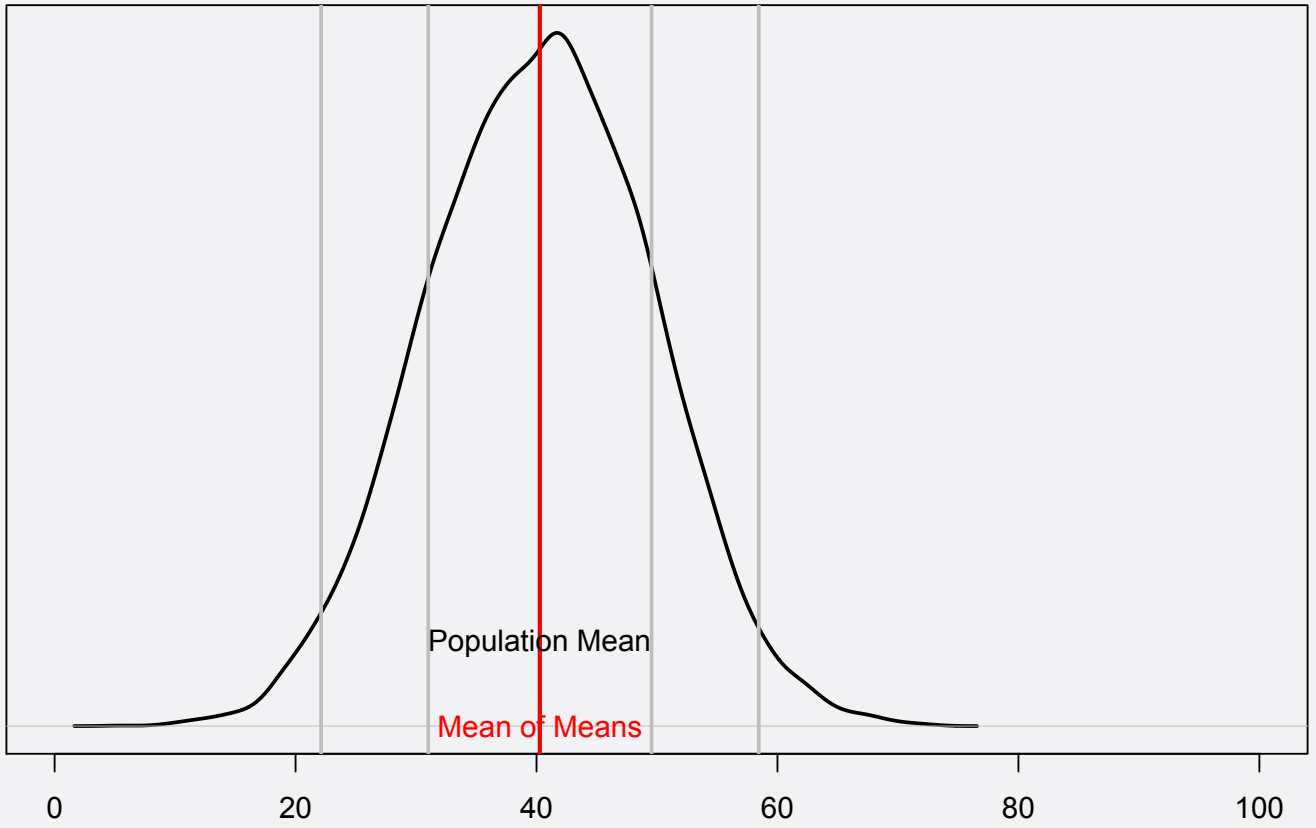
- Mean: 1060; Standard deviation: 195
- So: 95% of SAT scores between 1060-(1.96*195) and 1060+(1.96*195) [678-1442]

RECAP



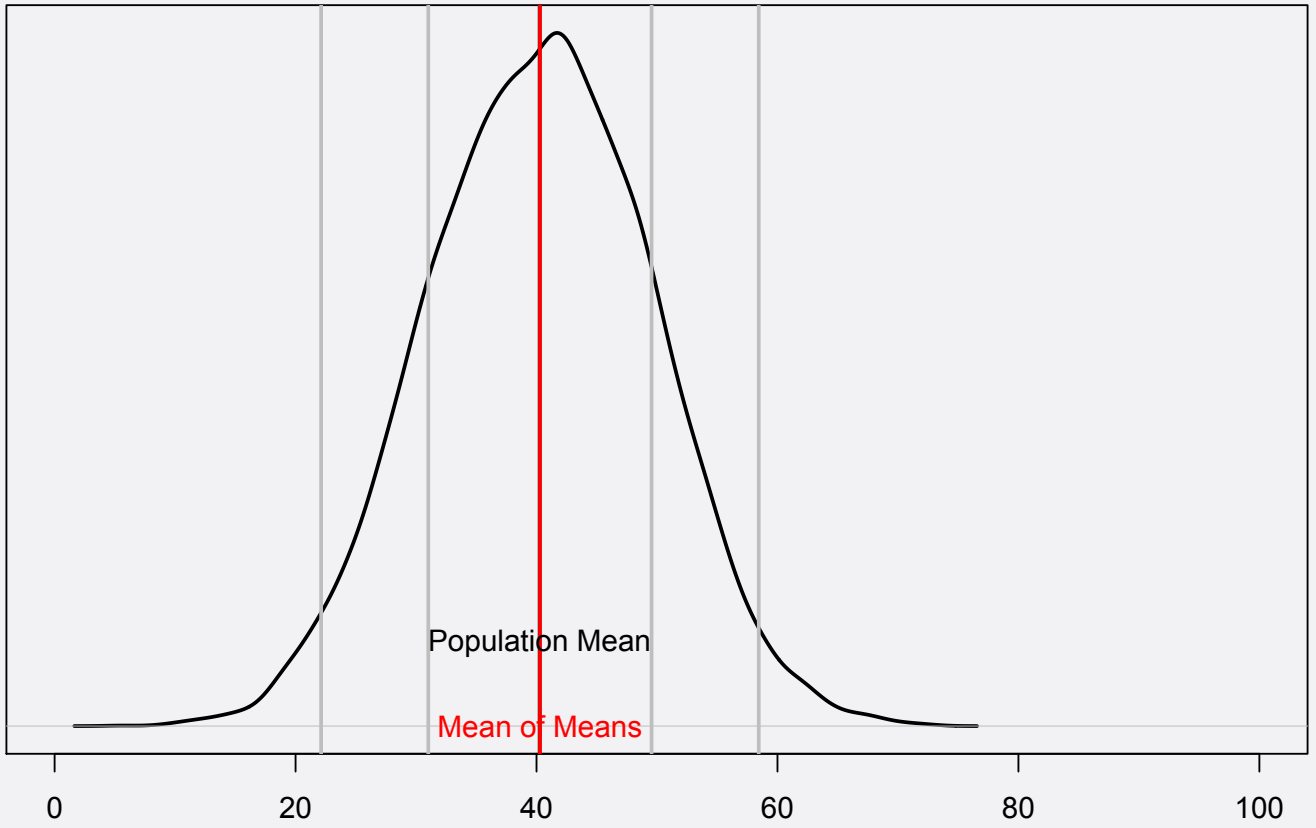
- If a variable follows a Normal distribution…
  - we know that 68% of observations are between mean ± 1SD, 95% between mean ± 1.96SD

WHAT DOES THIS HAVE TO DO WITH RANDOM SAMPLES?



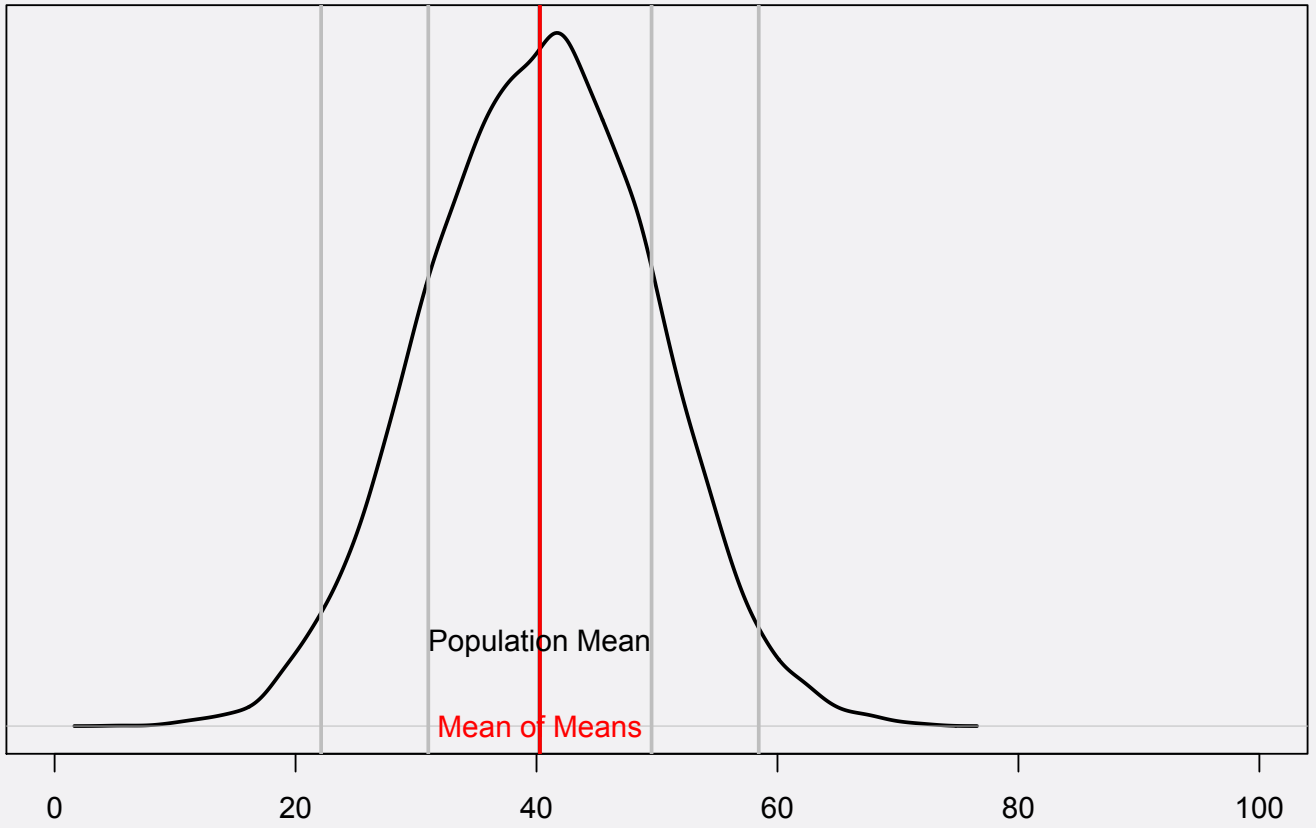
- If we take many random samples from a population
- and compute mean for each
- those means have a Normal distribution

WHAT DOES THIS HAVE TO DO WITH RANDOM SAMPLES?



- 68% of sample means will be within mean ± 1SD, 95% between mean ± 1.96SD

WHAT DOES THIS HAVE TO DO WITH RANDOM SAMPLES?



- Allows us to put a number on how large random measurement error is
- Which tells us how confident we can be that conclusions we draw from a sample hold in the population overall