PSC 202
SYRACUSE UNIVERSITY

INTRODUCTION TO POLITICAL ANALYSIS

EXAM REVIEW, MORE SAMPLING AND SURVEYS

SURVEY

- Take it if you haven’t yet!
- Response rate: 86%
  - Extra credit for whole class
- rebrand.ly/202survey

STUDENT HOURS

- **Next Monday: 11-1**
- 530 Eggers or Zoom
  - Zoom info on syllabus

TODAY

- Exam review
- More on sampling and surveys

TODAY

- Exam review
- More on sampling and surveys

EXAM

- Monday: Exam #1
  - Bring a calculator (no phone etc.)
  - Allowed to bring one single-page letter-size (8.5x11) sheet with you. Front page only. What you put on it is up to you, but it has to be your own sheet (we'll collect it)
- If you take exam at CDR, please sign up now!

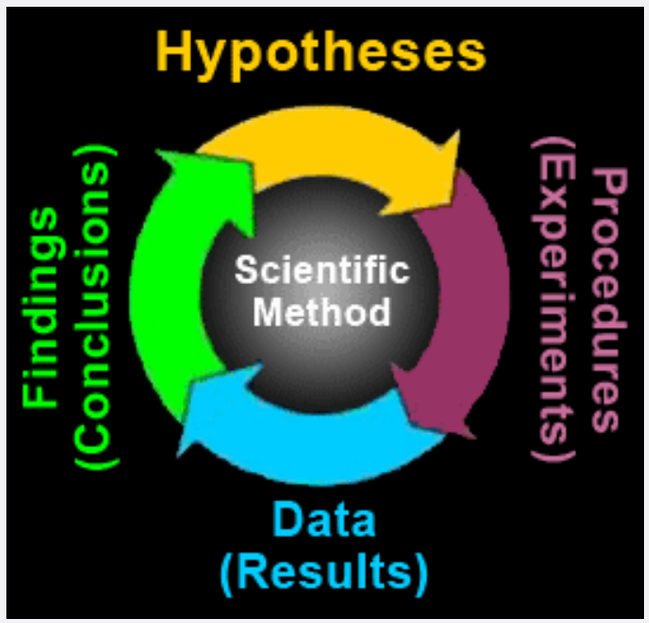
- No new problem set this week
  - No quiz for Monday

EXAM

- Material covered
- Everything from Jan 18 (Course intro) to Feb 13 (Monday)

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

- **Major entity we want to analyze in a study: "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

- Important in exam: Time management!
- Time spent on each question should be proportional to how many points they are

EXAM

- What to do and bring
  - Be a few minutes early
  - Bring calculator and pen/pencil
  - Bring your cheat sheet
  - Show your steps
  - Remember time management
  - Write legibly

EXAM

- Questions?

TODAY

- 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 JANUARY 25, 2023

Biden Averaged 41% Job Approval in His Second Year

Results for this Gallup poll are based on telephone interviews conducted Jan. 2-22, 2023, with a random sample of 1,011 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 41% approval rating among 1,011 respondents is close to the approval rating of *all* American voters?**

RECAP

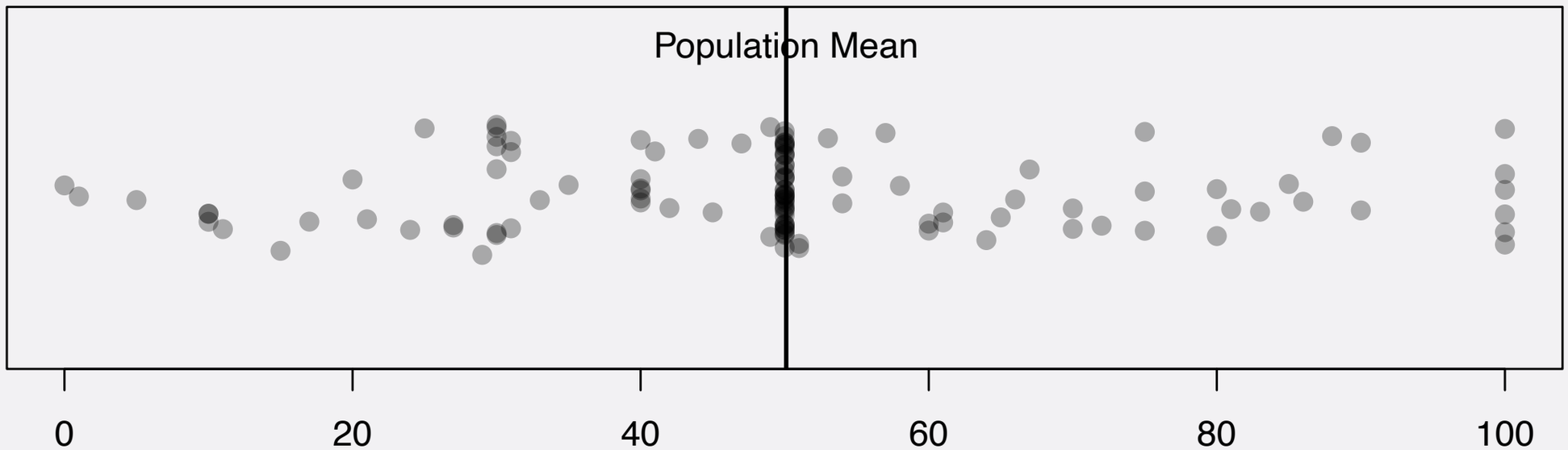
Unknown: Approval rating in population

Known: Approval rating in survey

- Population parameter = Sample statistic + random sampling error

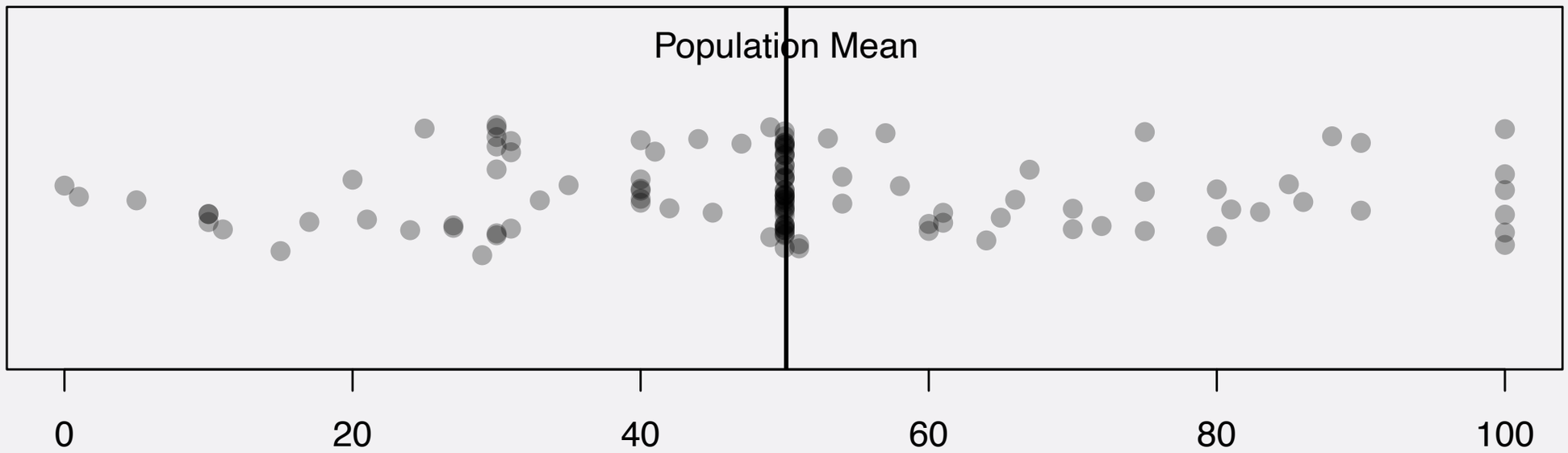
We can figure this out

OUR SURVEY: J. BOEHEIM



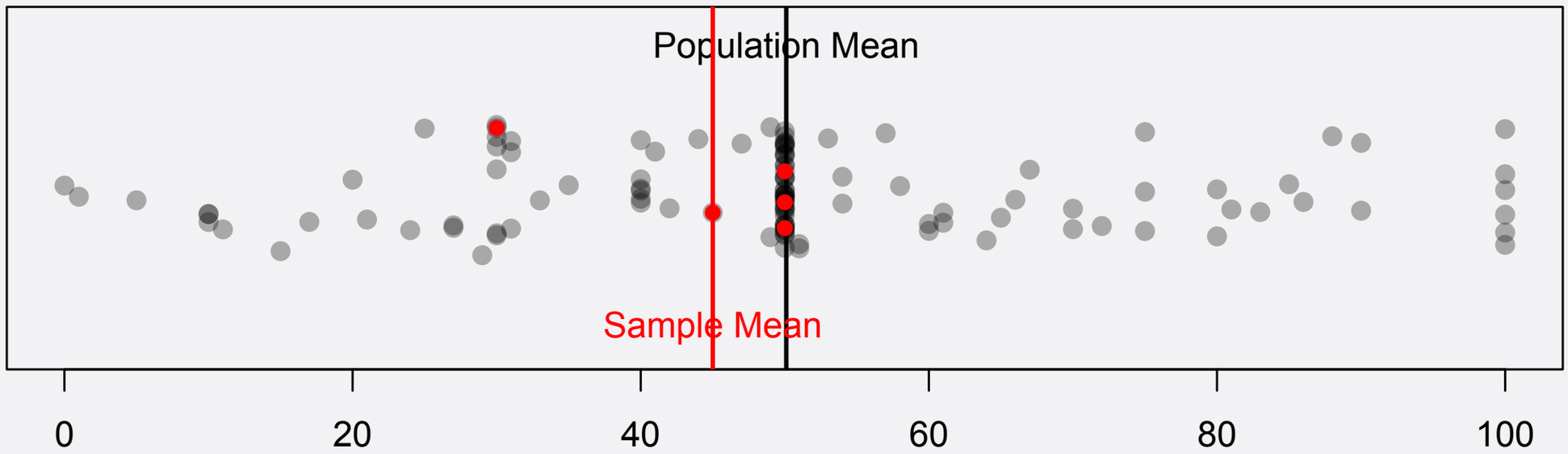
- **Mean: 50.1**
- **Standard deviation: 22.1**

OUR SURVEY



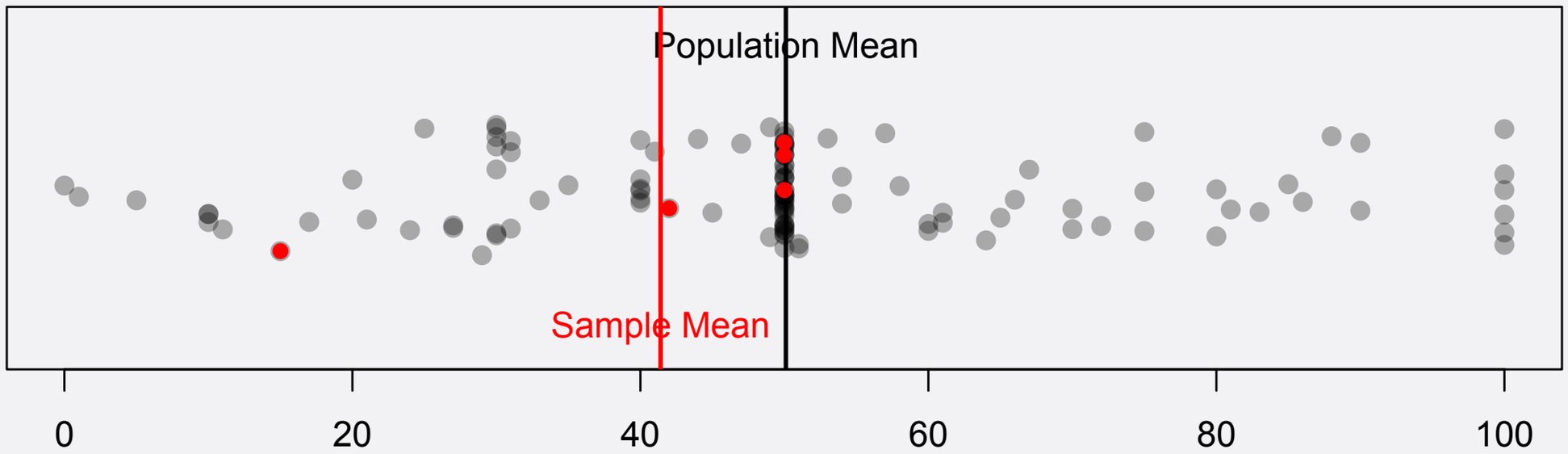
- Took random sample of 5 students
- Record average rating of those 5 students
- Do this thousands of times

OUR SURVEY



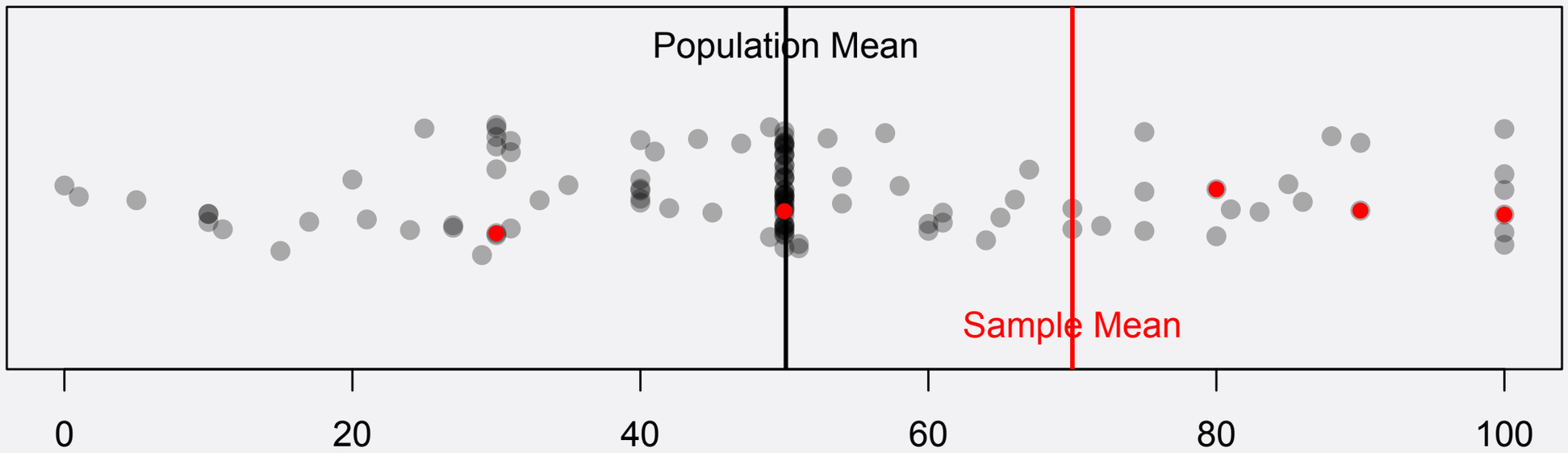
- First random sample
- Sample mean: 45

OUR SURVEY



- Second random sample
- Sample mean: 41.4

OUR SURVEY

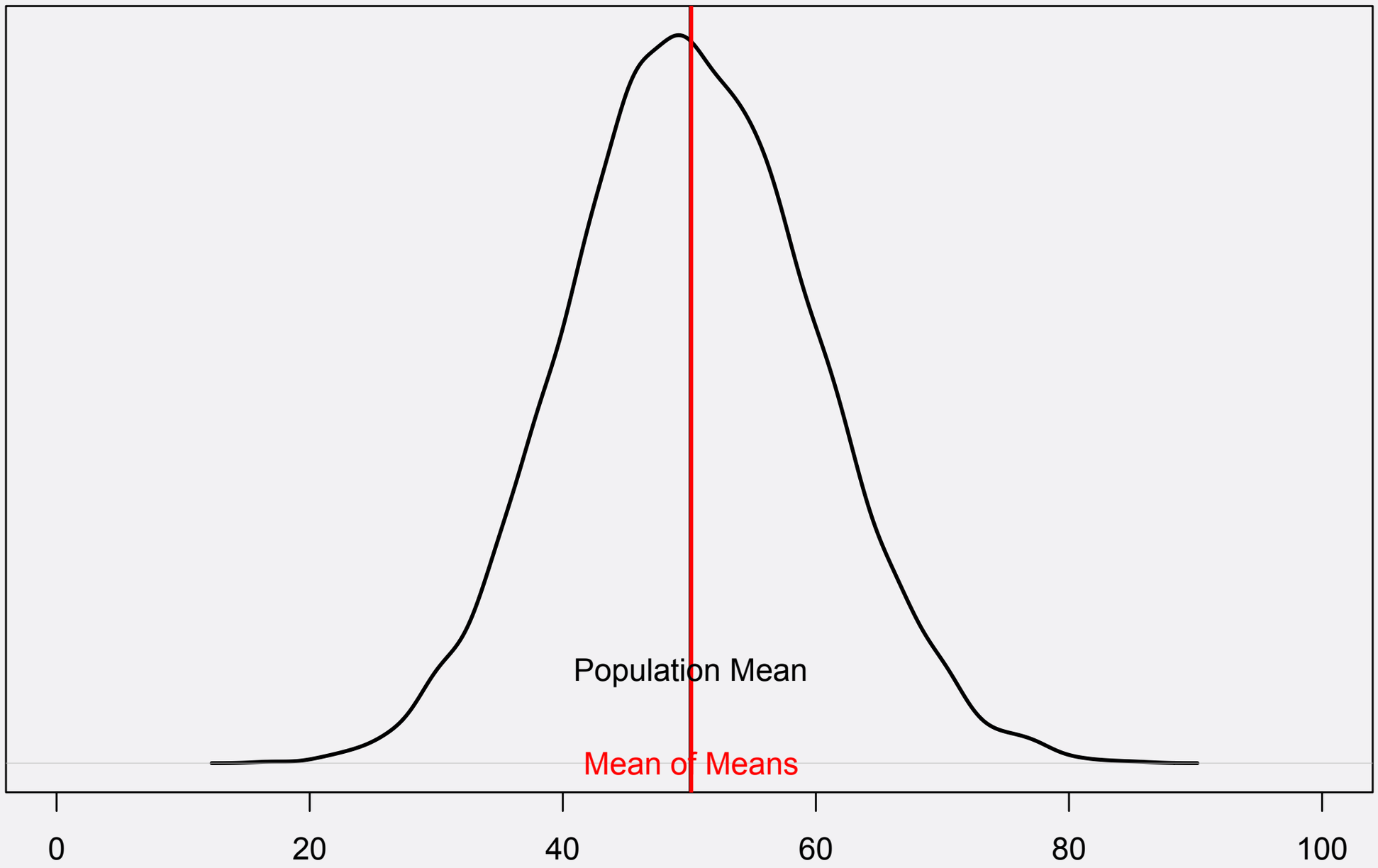


- Third random sample
- Sample mean: 70

OUR SURVEY

- We do this many times
  - Sample means jump around
  - Some are far away from population mean, but most are quite close
  - Mean of sample means gets pretty close to the population mean

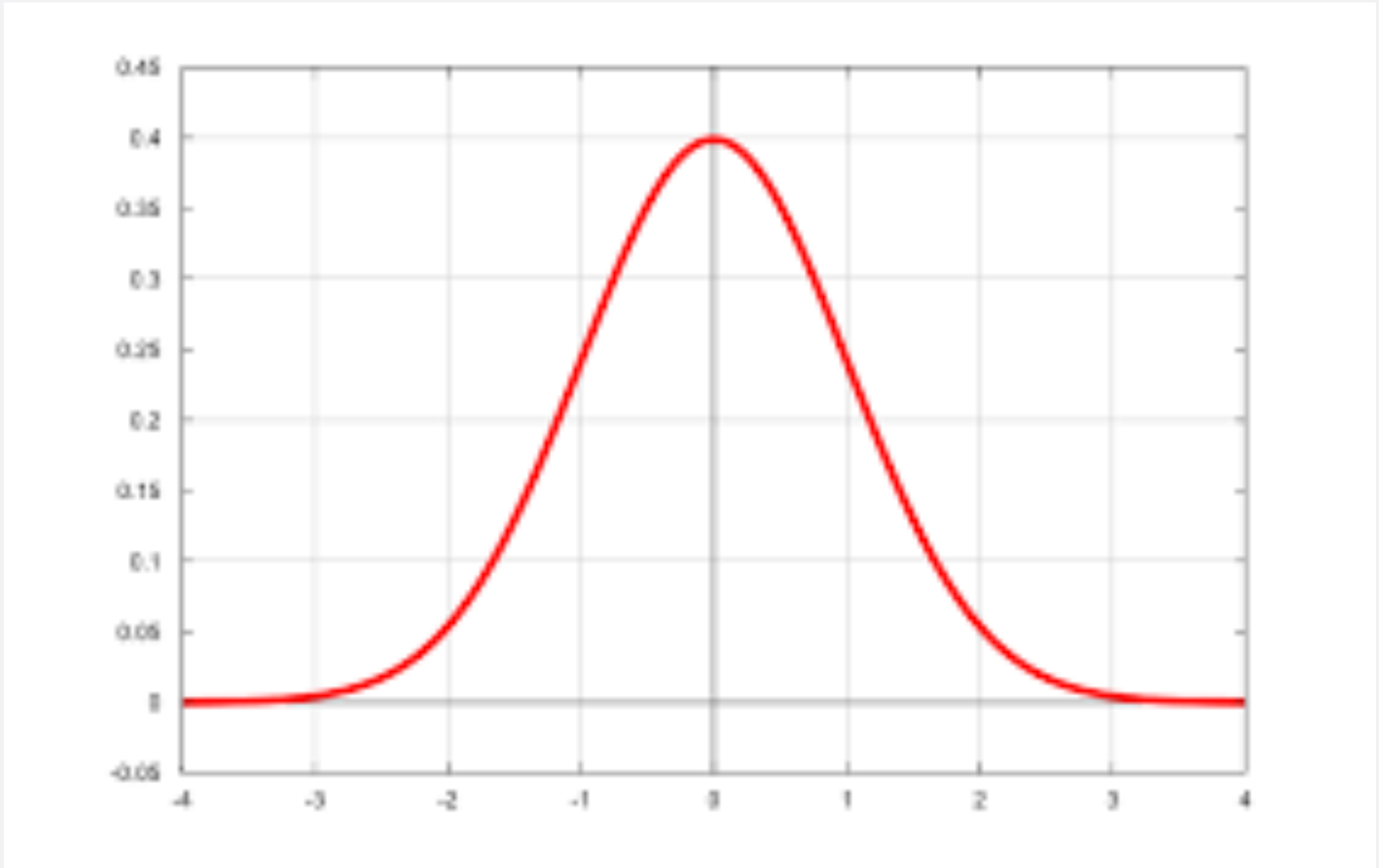
AFTER 10,000 RANDOM SAMPLES



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

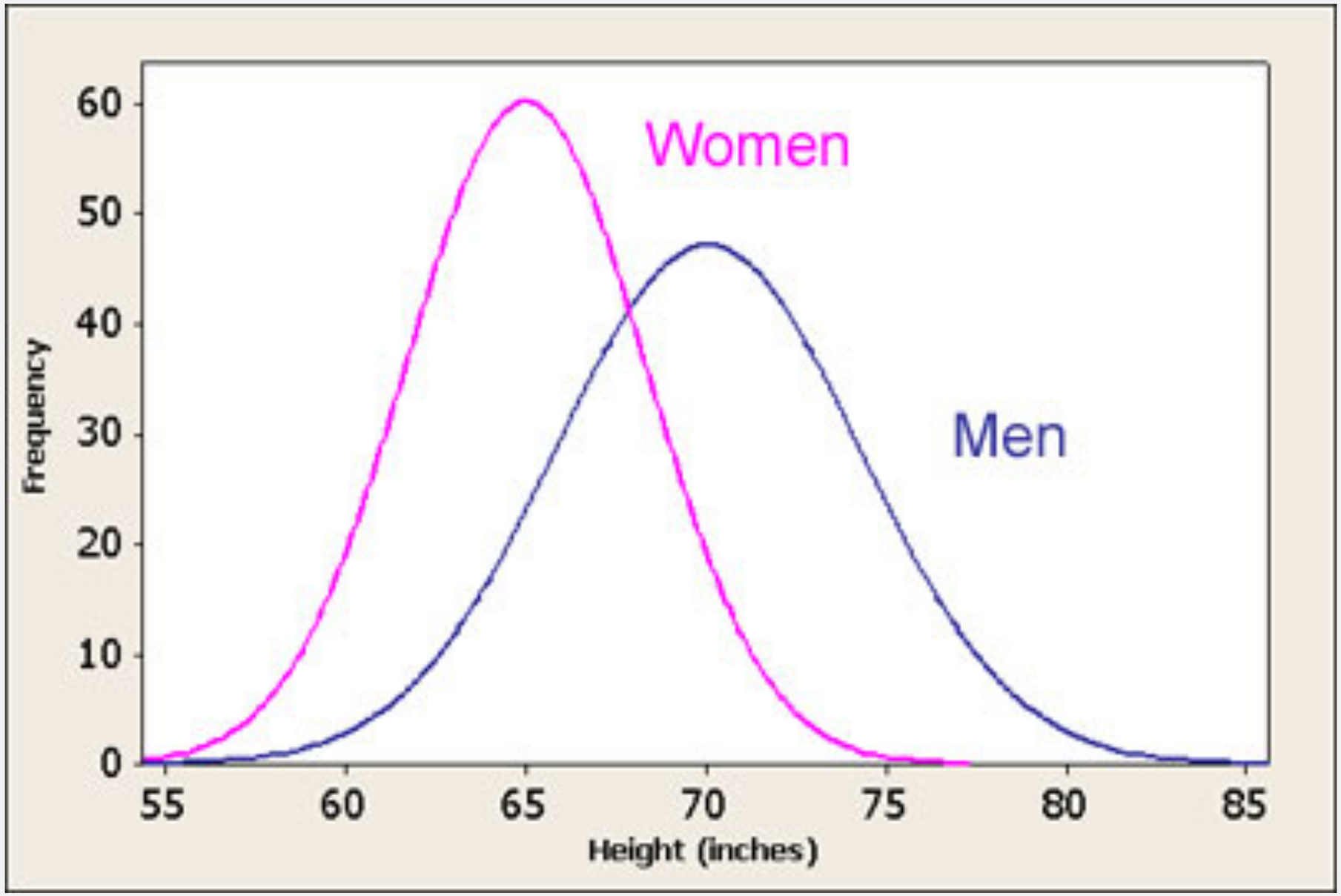


- You'll need to know about the normal distribution

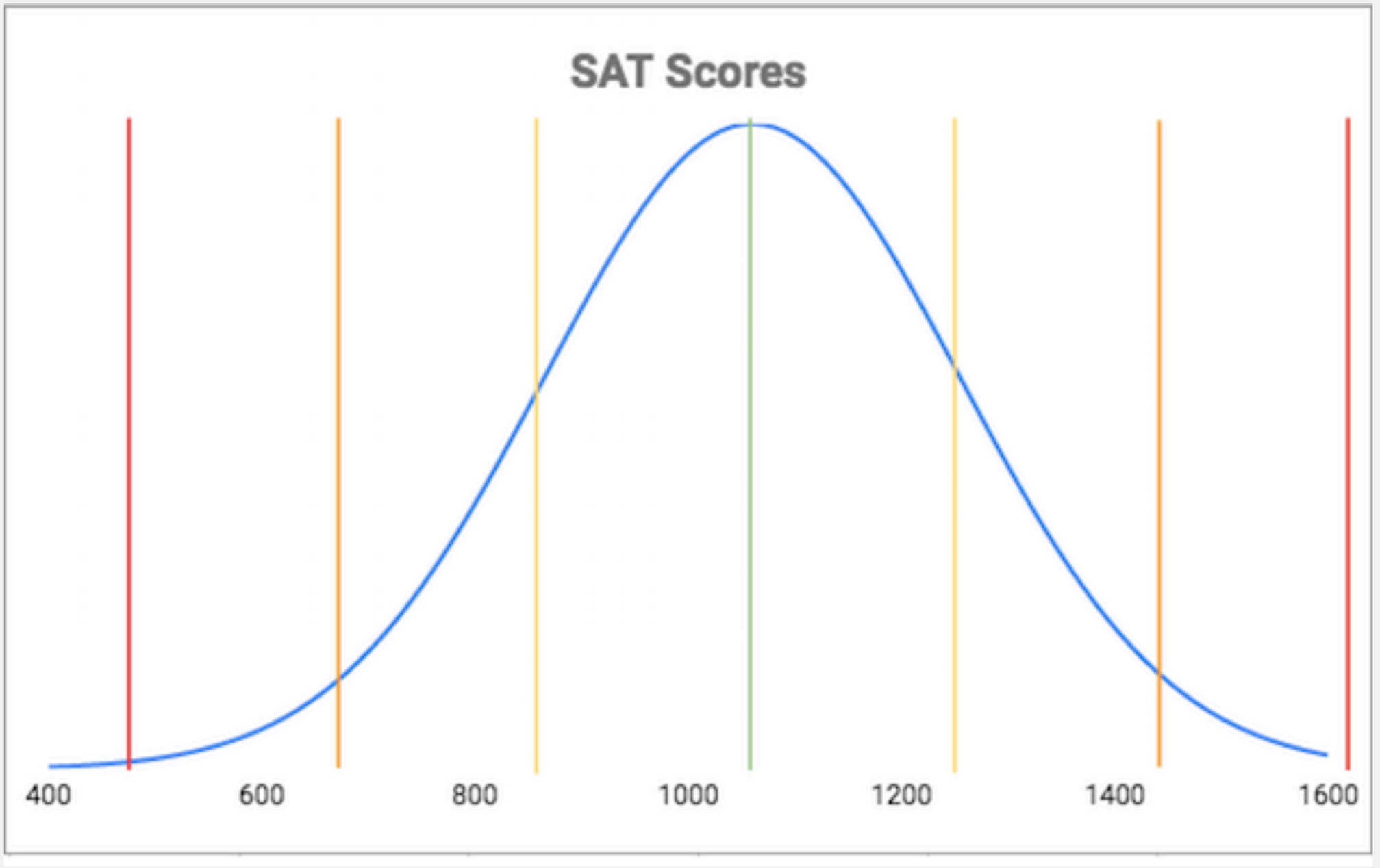
NORMAL DISTRIBUTION

- 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



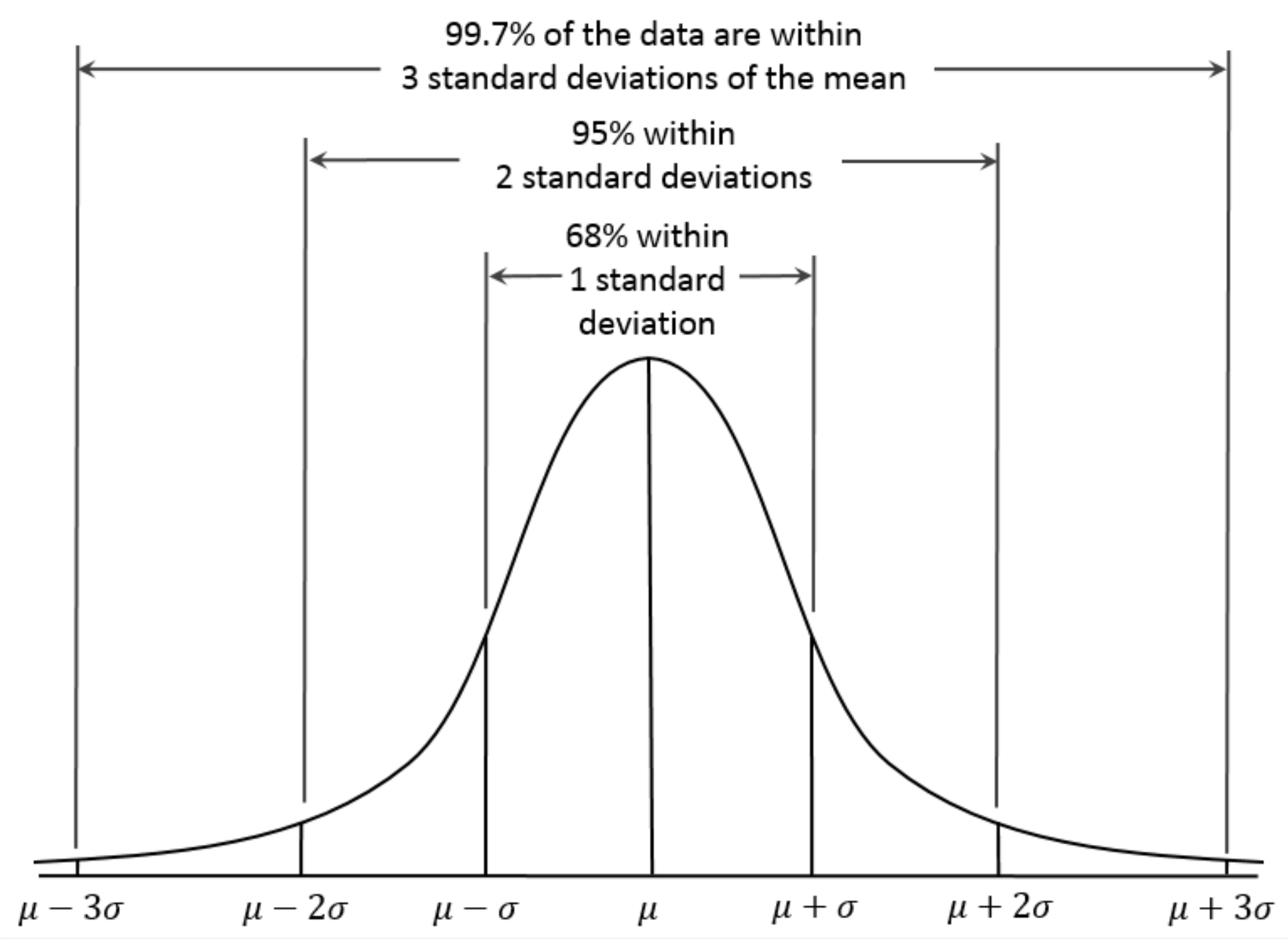
NORMAL DISTRIBUTION



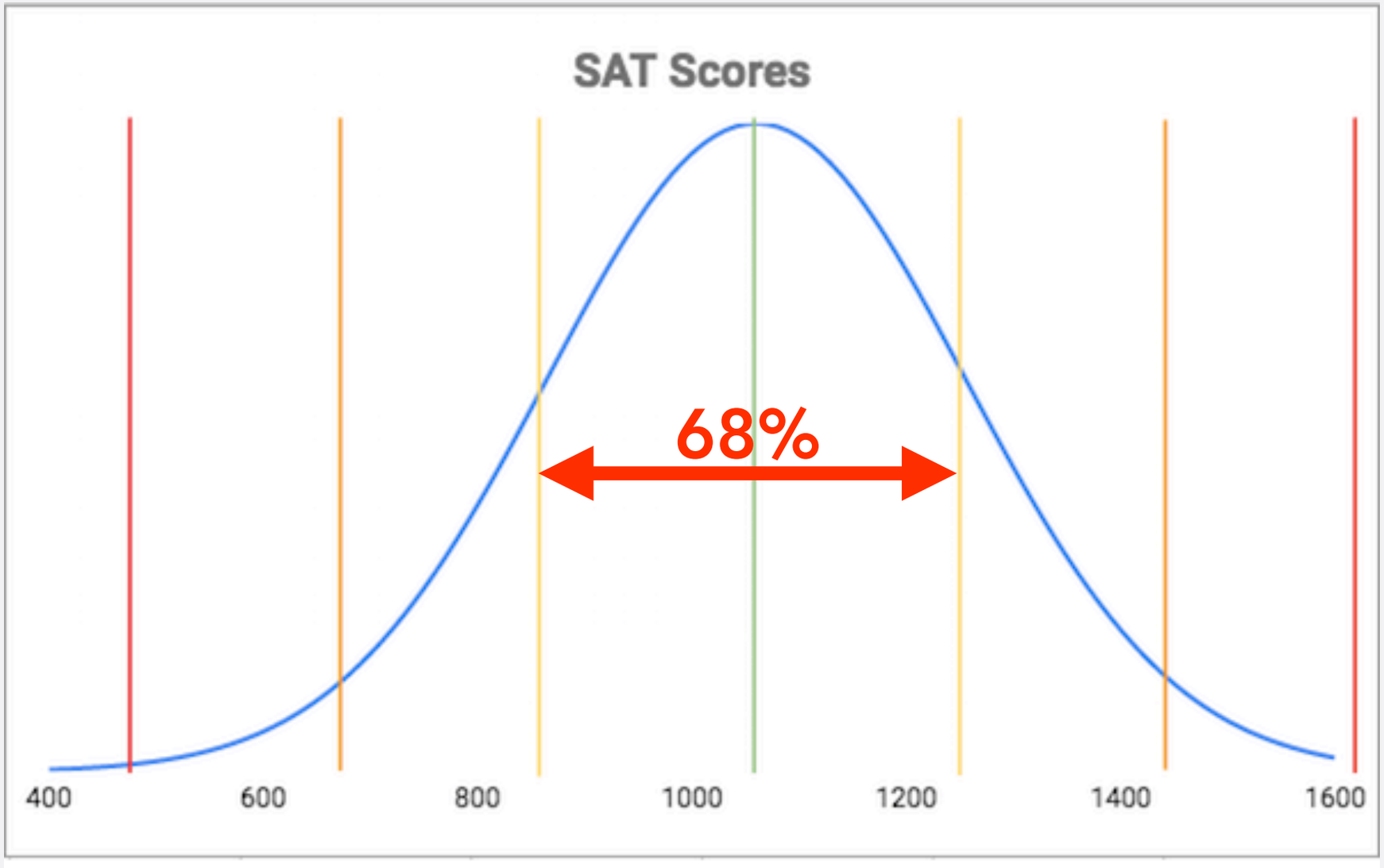
- **Mean: 1060**
- **Standard deviation: 195**

NORMAL DISTRIBUTION

- Important characteristic of *all* Normal distributions:

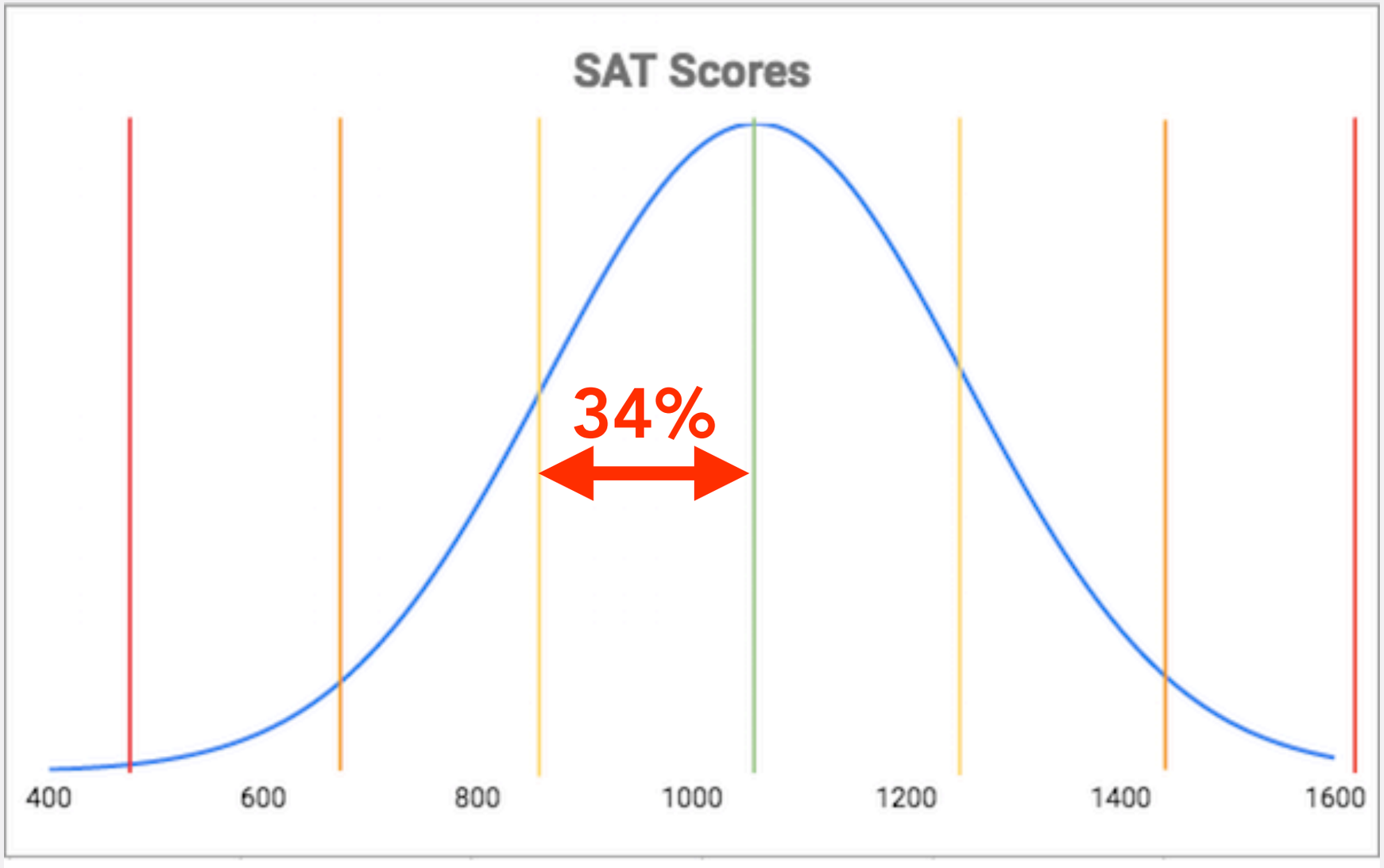


NORMAL DISTRIBUTION



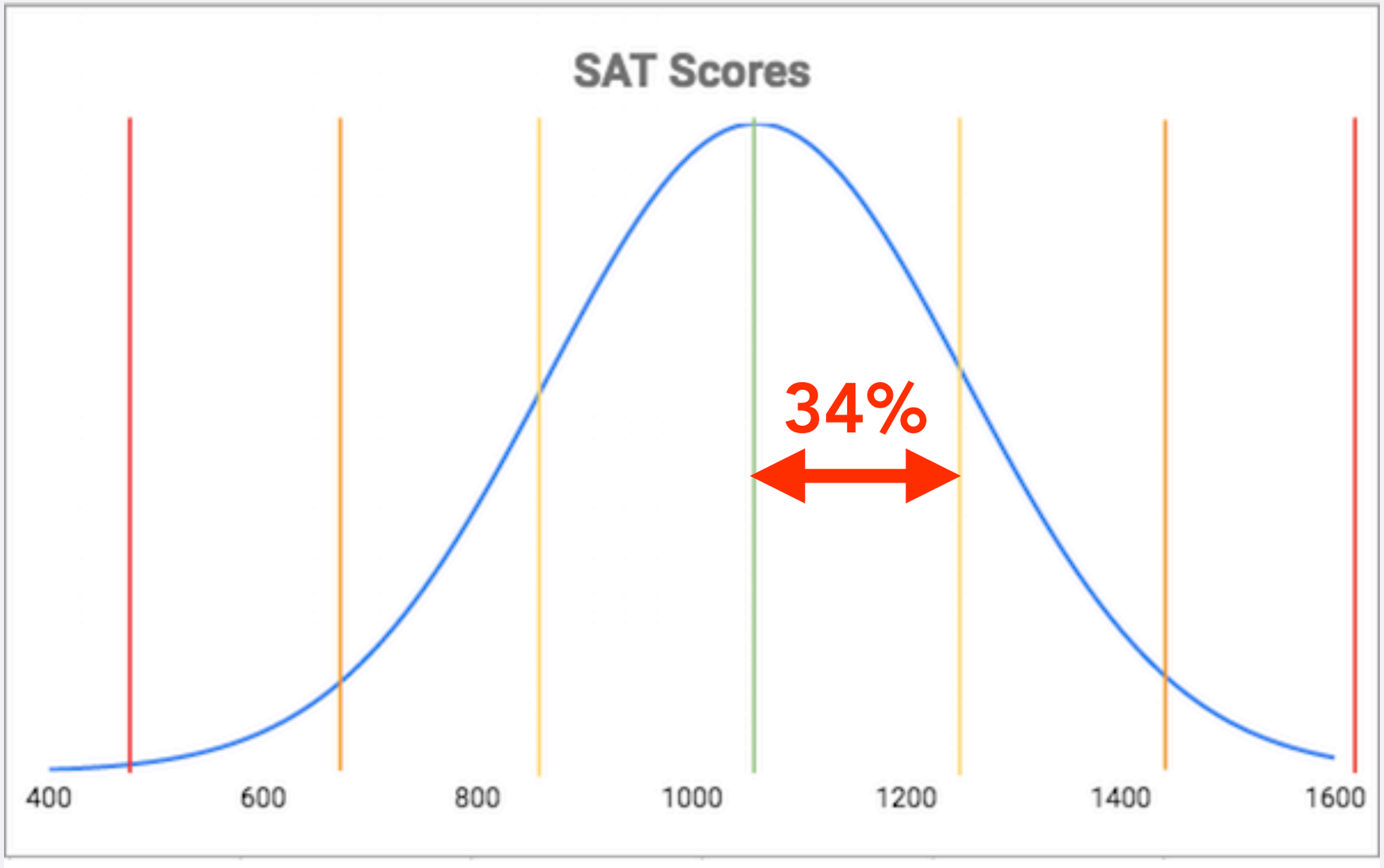
- Mean: 1060; Standard deviation: 195
- So: 68% of SAT scores between 1060-195 and 1060+195 (865-1255)

NORMAL DISTRIBUTION



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

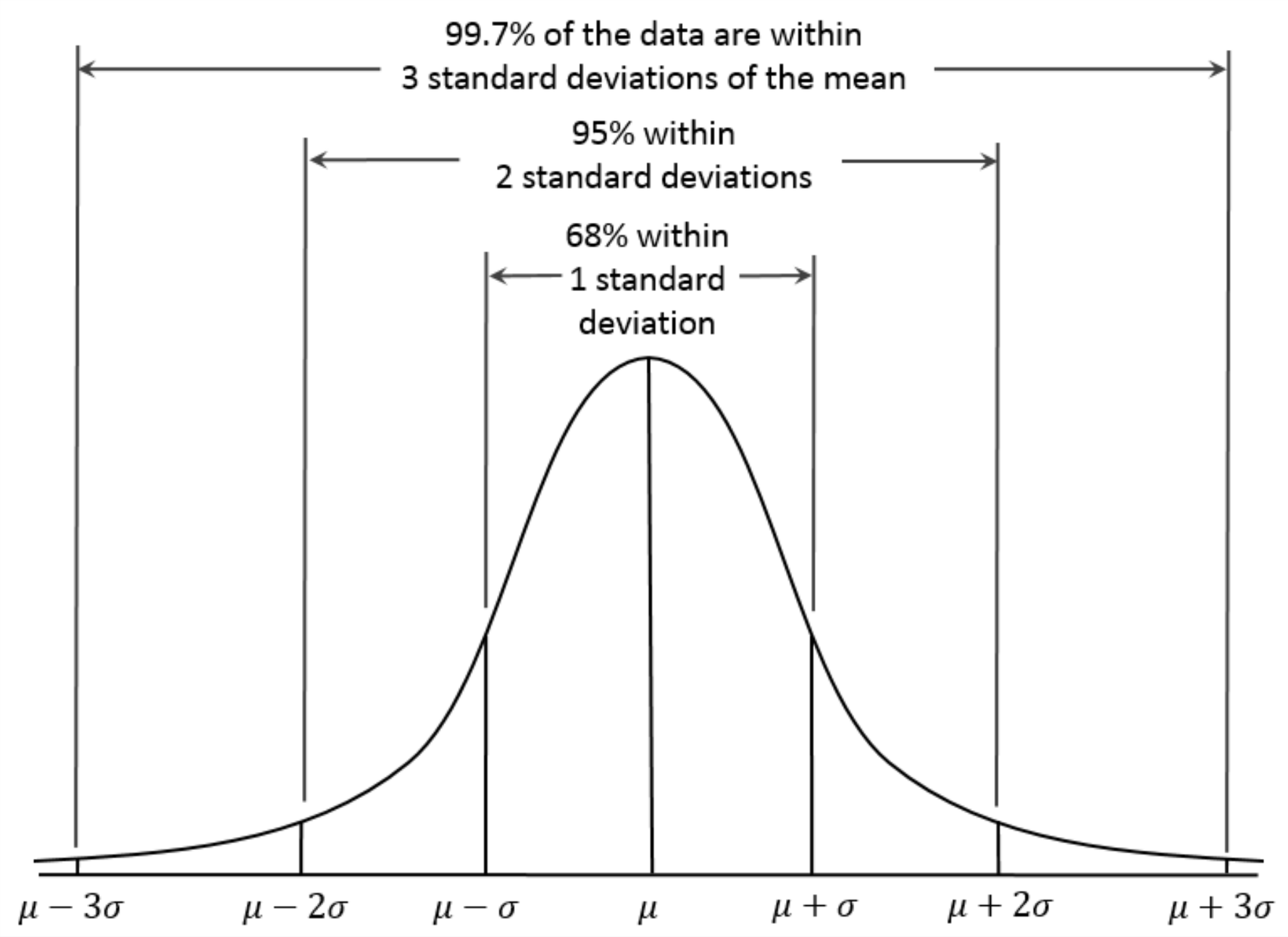
NORMAL DISTRIBUTION



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

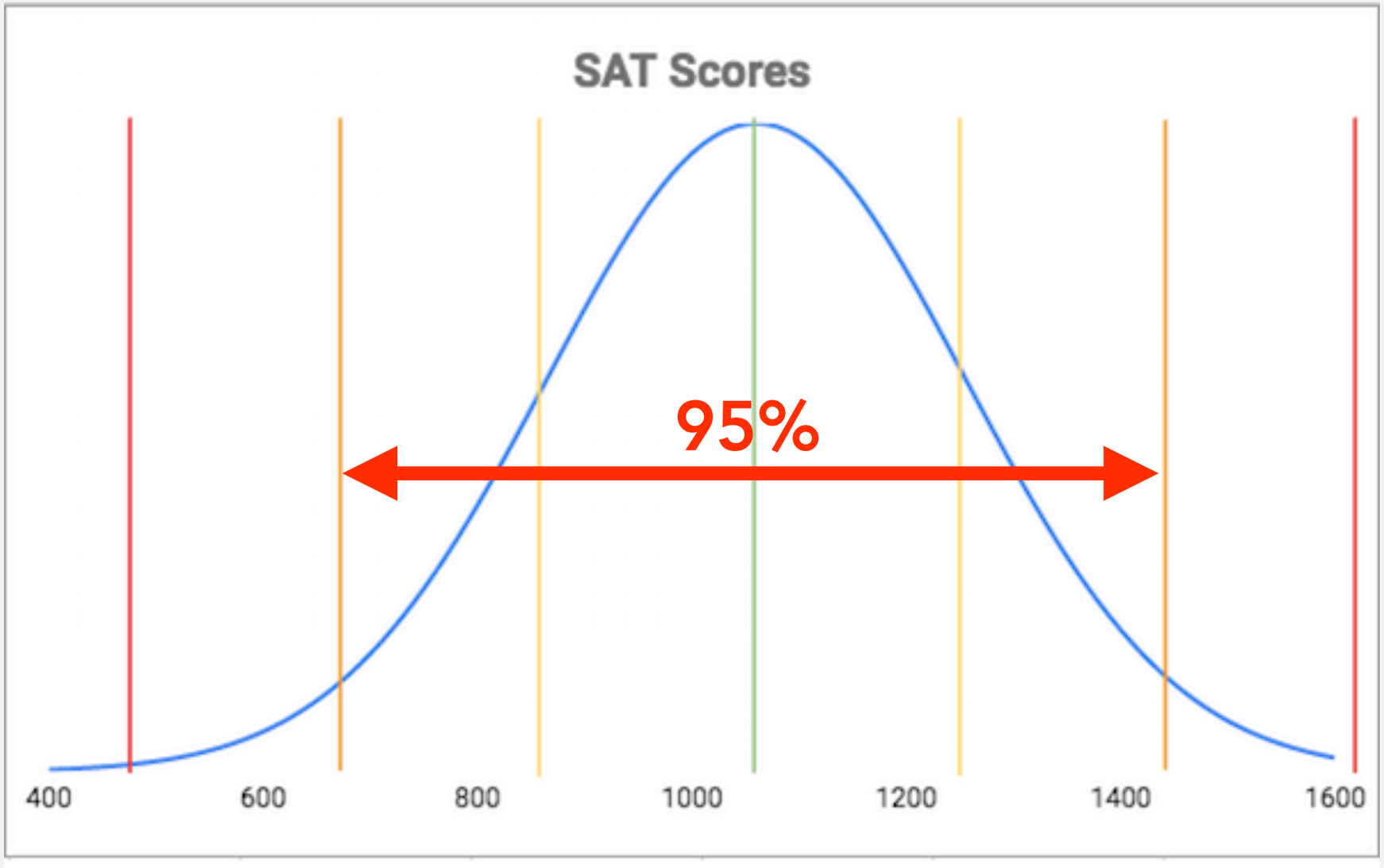
NORMAL DISTRIBUTION

- **Important characteristic of *all* Normal distributions:**



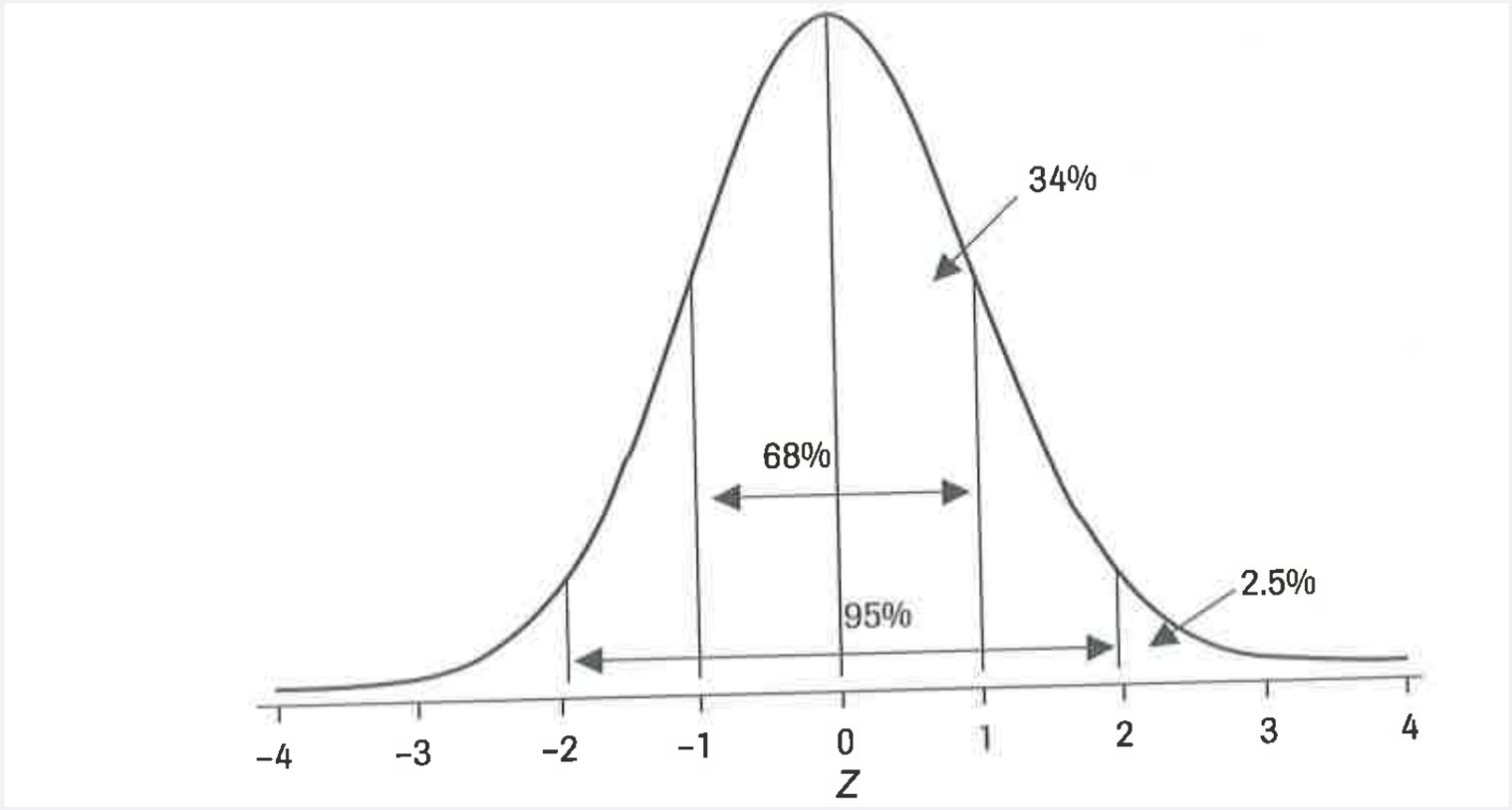
- **Actually: 95% within 1.96 standard deviations**

NORMAL DISTRIBUTION



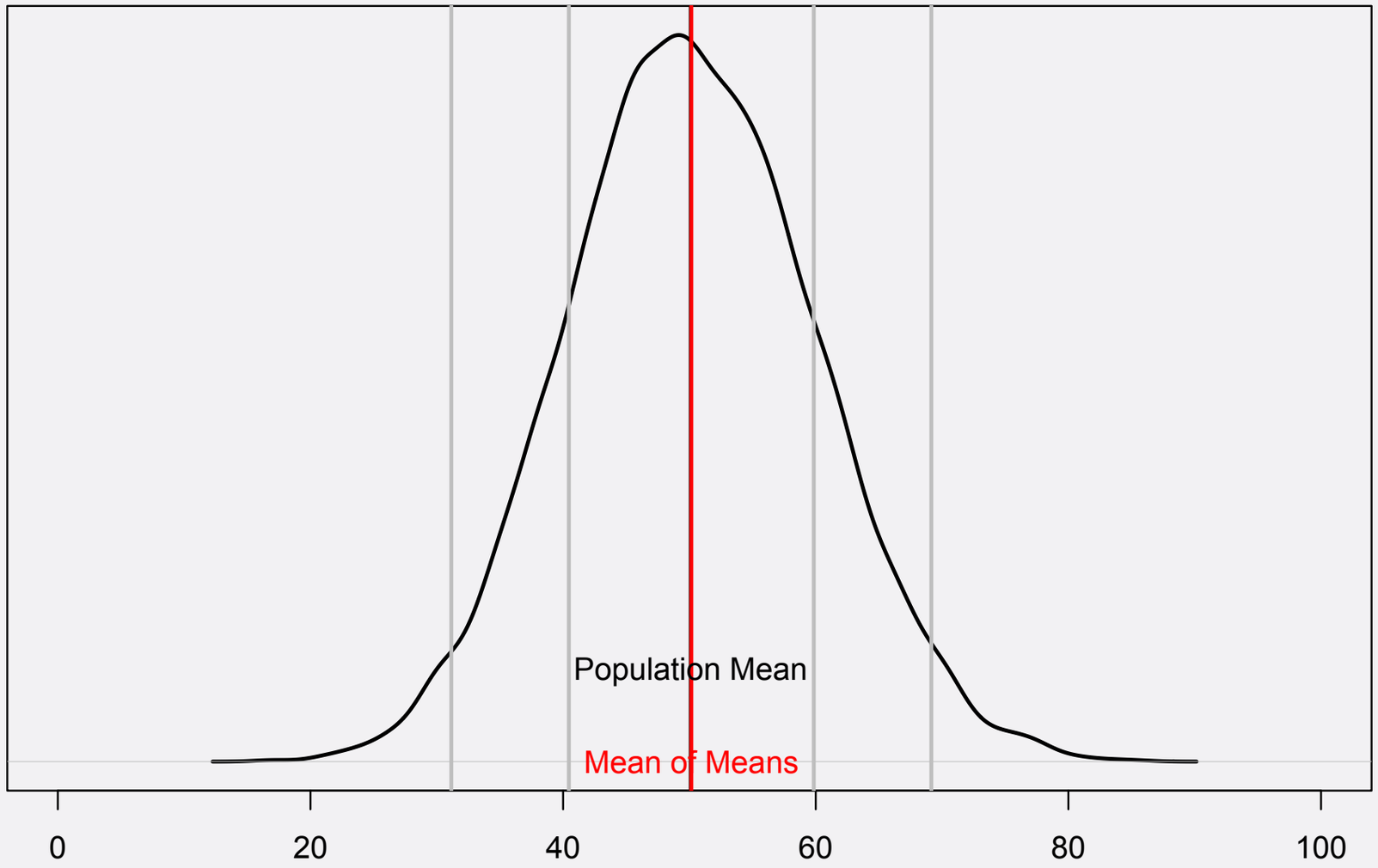
- Mean: 1060; Standard deviation: 195
- So: 95% of SAT scores between 1060-(1.96*195) and 1060+(1.96*195) [678-1442]

RECAP



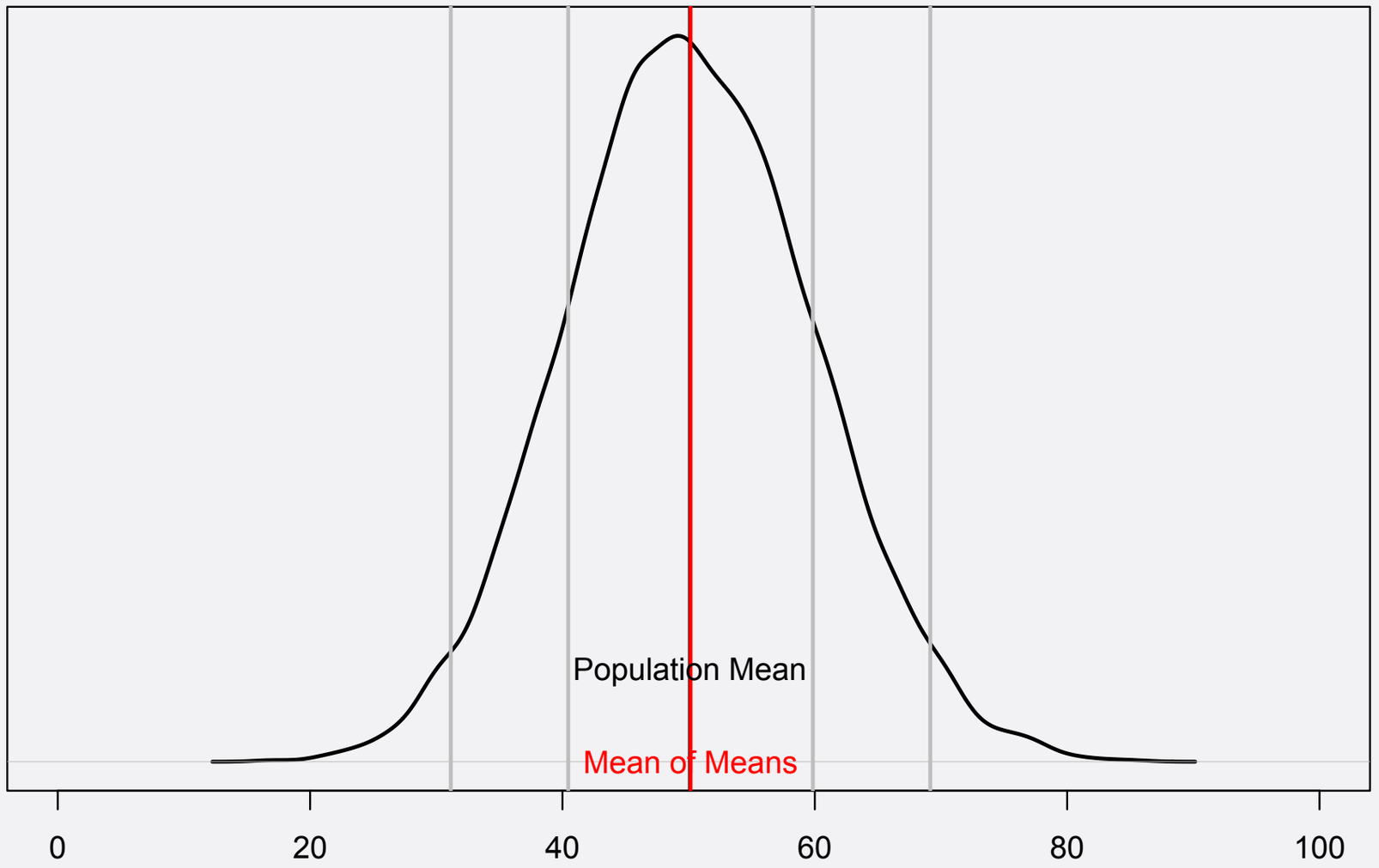
- If a variable follows a Normal distribution…
  - we know that 68% of observations are between mean ± 1SD, 95% between mean ± 1.96SD

WHAT DOES THIS HAVE TO DO WITH RANDOM SAMPLES?



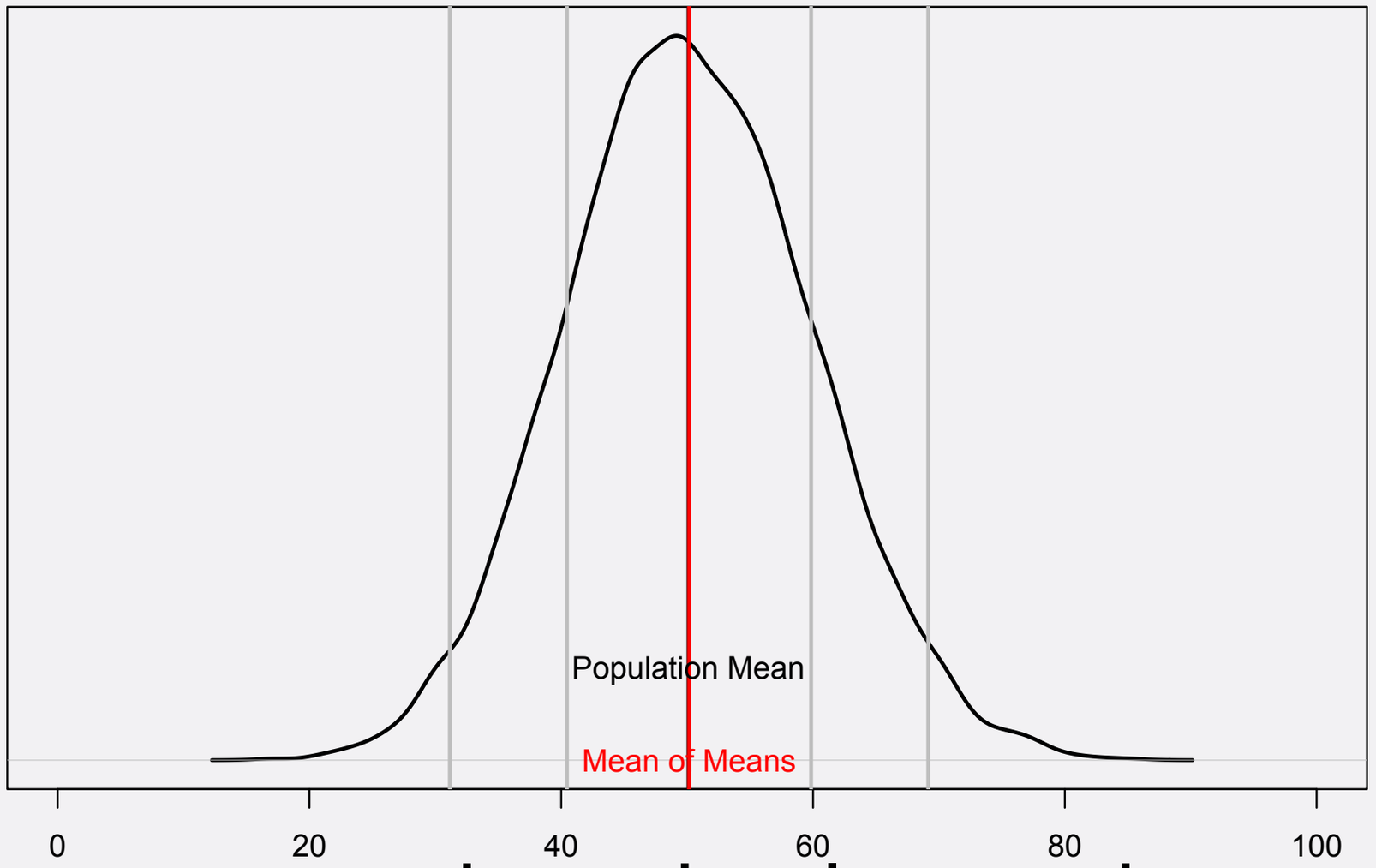
- If we take many random samples from a population
- and compute mean for each
- those means have a Normal distribution

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