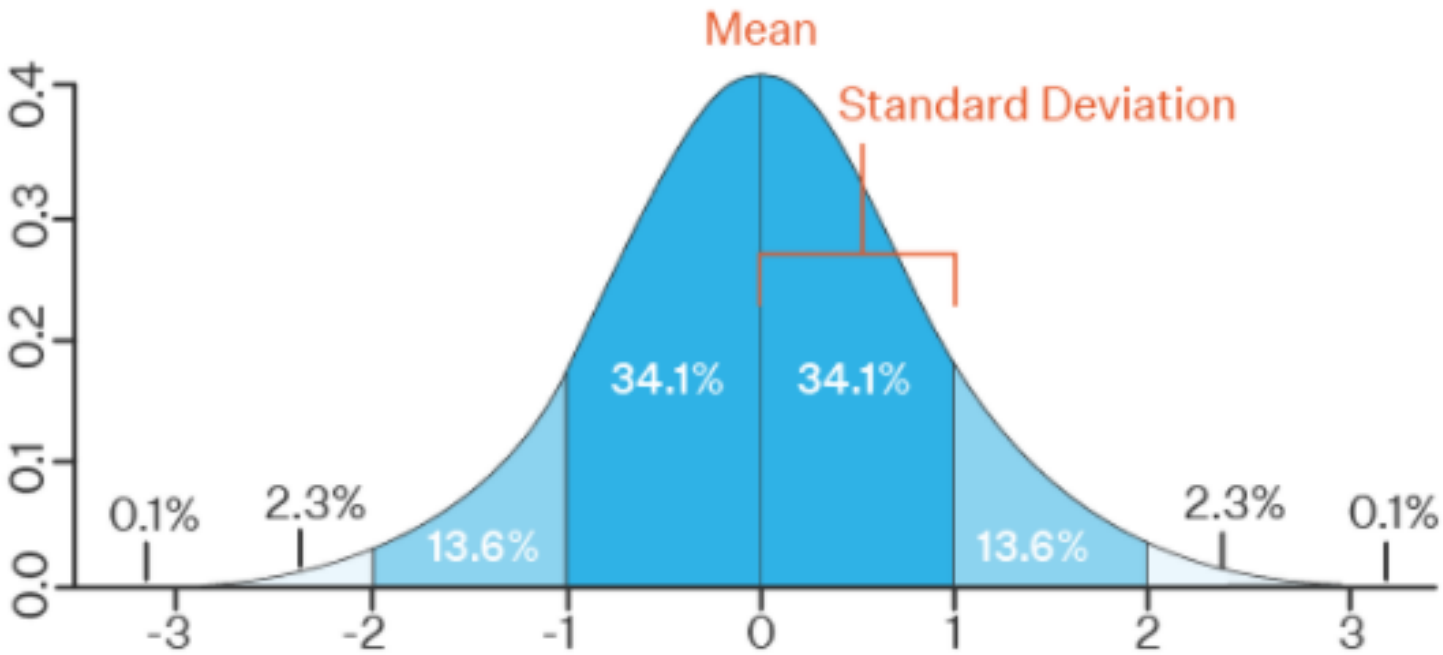
TA Session 3: Intro to Normal Distribution

Harris Coding Camp – Standard Track

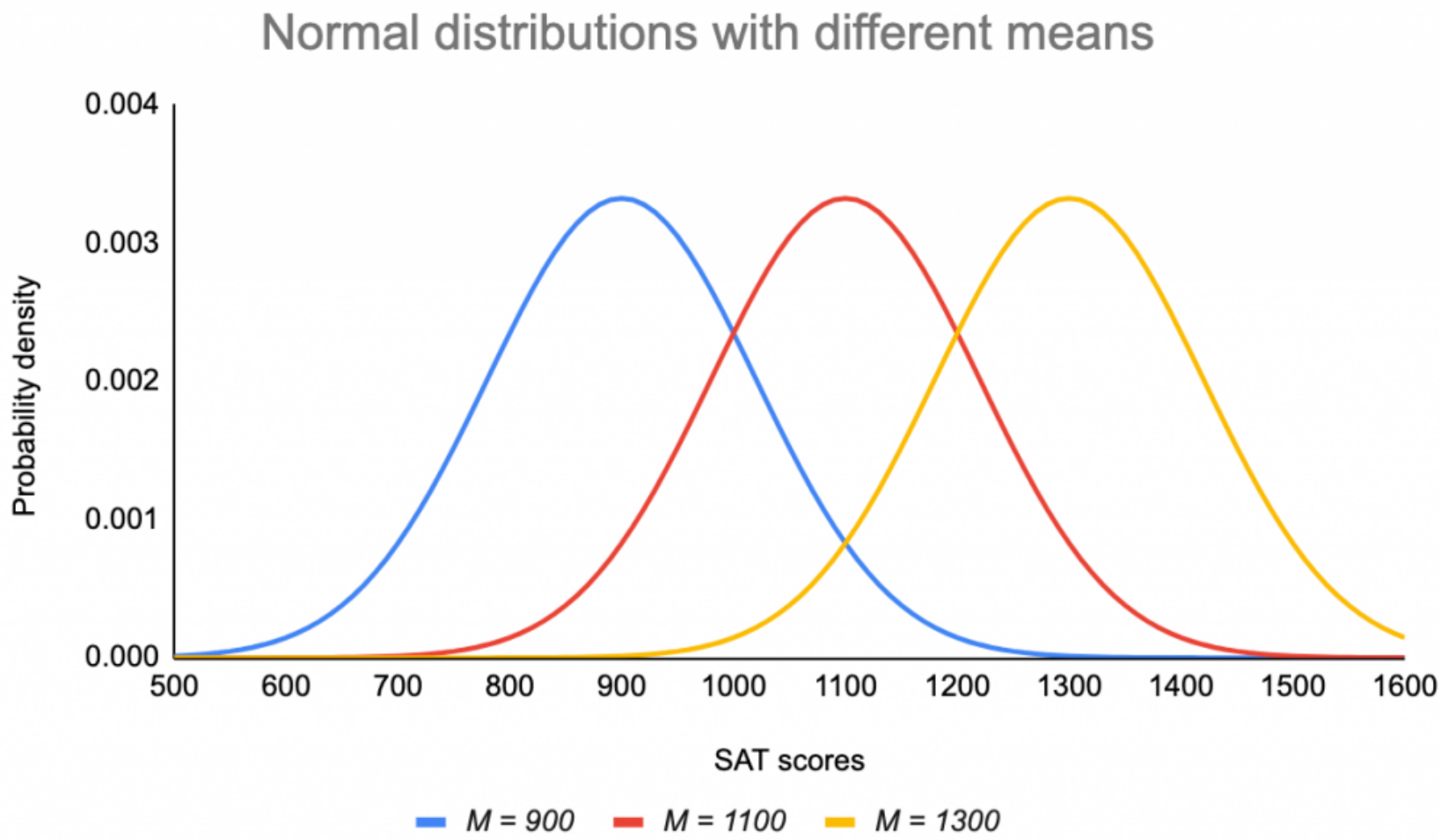
Summer 2023

Normal Distribution



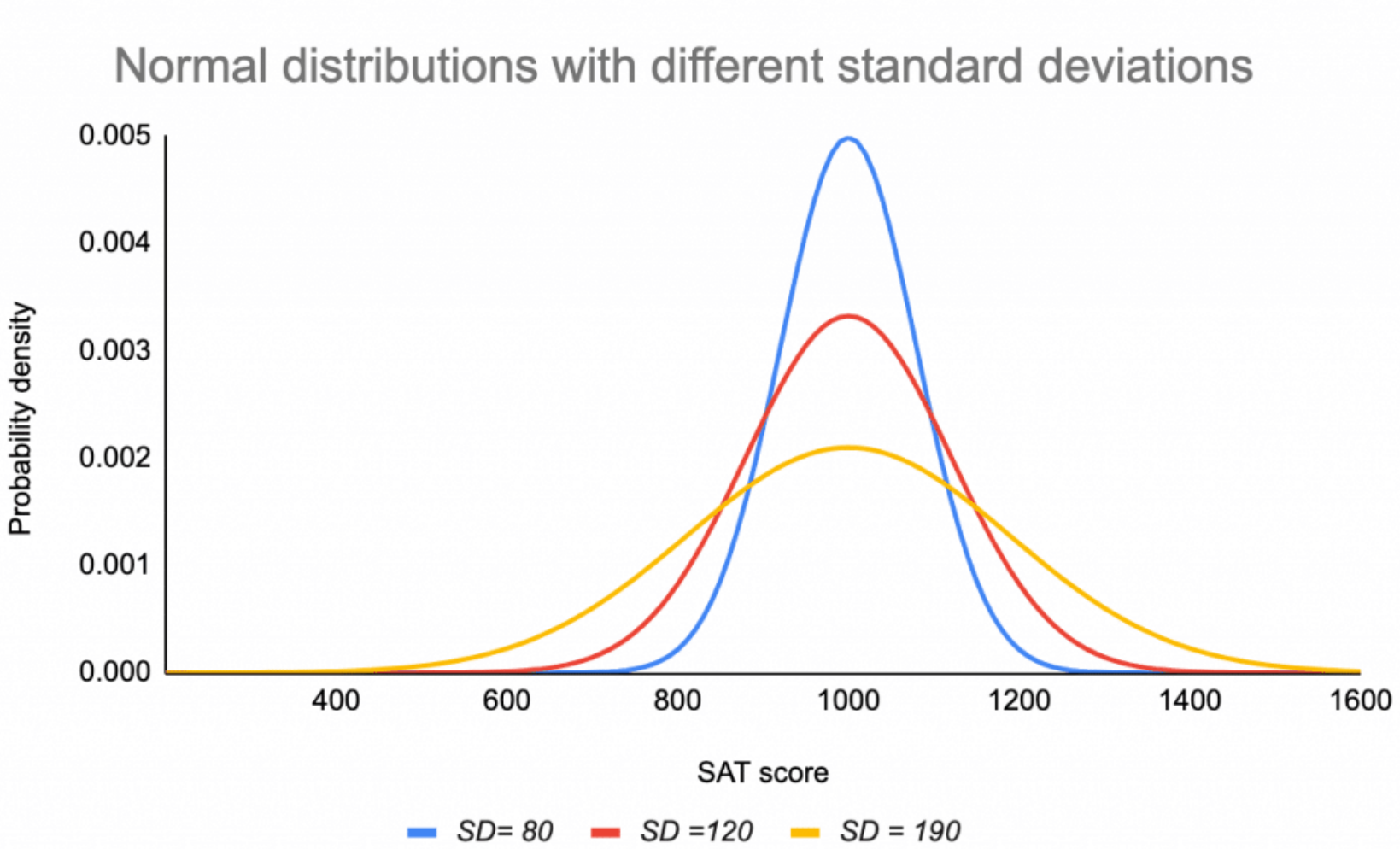
- Most commonly used distribution; bell-curved shape
- Important parameters: **mean & standard deviation**
  - Mean indicates where data points are centered
  - Standard deviation measures how data points are spread out

Normal Distribution



Mean is the average of a set of values. It also indicates where data points are centered.

Normal Distribution



Variance is a measure of how far a set of data are spread out from their mean value

- **Standard deviation** is the sqrt of variance

Normal Distribution and `rnorm()`

At times, we feel the need to generate numbers at random to test certain hypothesis in statistics. Usually, we consider generating random numbers that follow a normal distribution using `rnorm()` function:

```
rnorm(num, mean, sd)
```

- `num`: number of values that needs to be generated
- `mean`: mean value of the normal distribution. Its default value is 0.
- `sd`: sd of the normal distribution. Its default value is 1.

```
data <- rnorm(10)
data
#>  [1] -0.90188666 -1.78137000  1.59892501 -0.95245523 -0.41138151  0.
#>  [7] -1.21929717 -1.00075263 -0.02113076  0.98152536
```

Normal Distribution and `rnorm()`

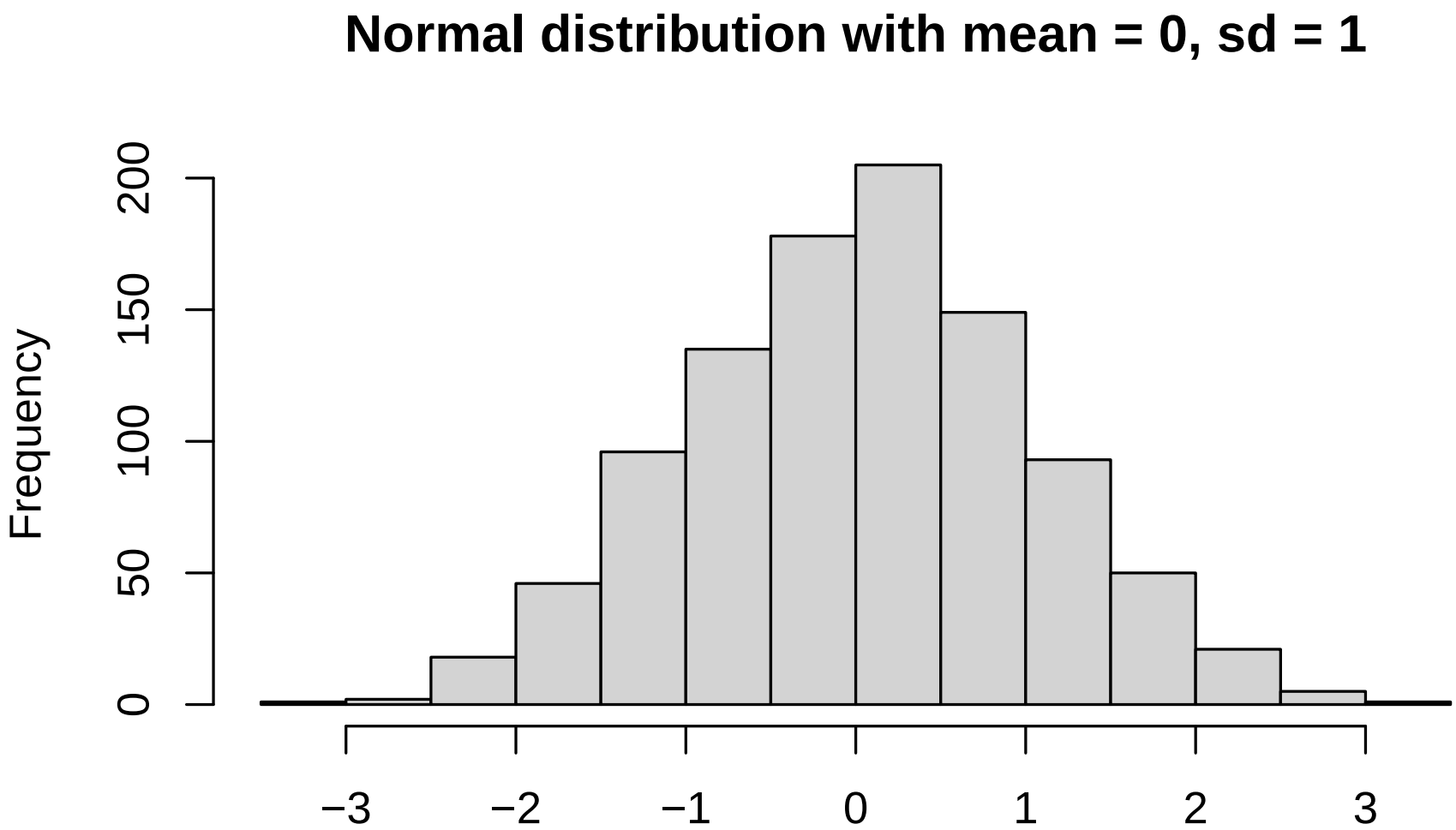
Occationally, we consider generating random numbers that follow a normal distribution with specific mean and sd:

```
data_1 <- rnorm(1000, 5, 2)
mean(data_1)
#> [1] 5.092044
sd(data_1)
#> [1] 1.964568
```

Normal Distribution and `rnorm()`

We can do simple simulation by generate 1000 random numbers using `rnorm()` and create a histogram based on that distribution:

```
data <- rnorm(1000, 0, 1)
hist(data, main = "Normal distribution with mean = 0, sd = 1")
```



Normal Distribution and `rnorm()`

We can do simple simulation by generate 1000 random numbers using `rnorm()` and create a histogram based on that distribution:

```
data <- rnorm(1000, 0, 10)
hist(data, main = "Normal distribution with mean = 0, sd = 10")
```