

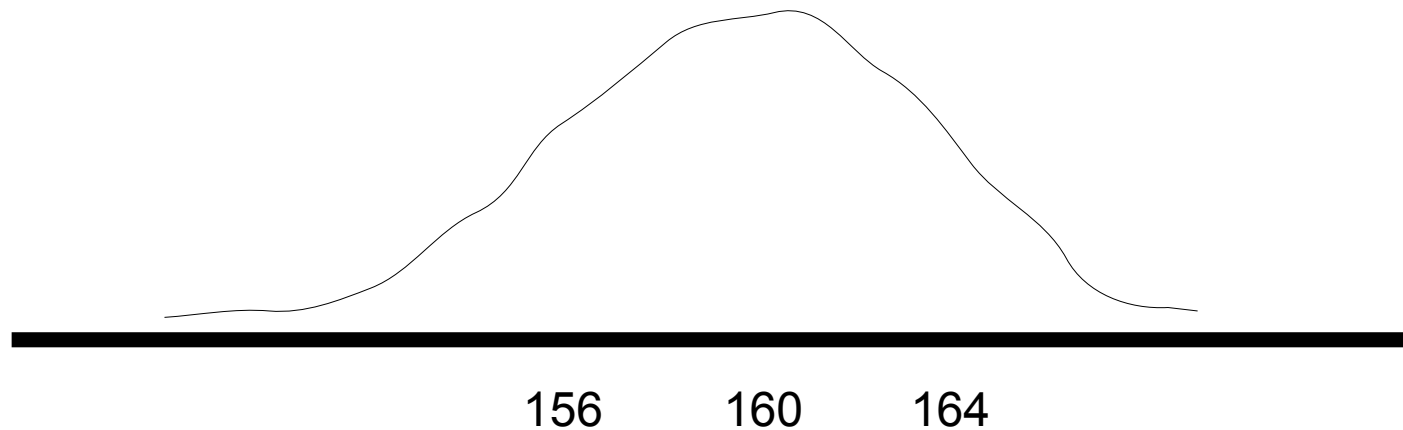
# What is the difference between NormalPDF and NormalCDF?

NormalPDF gives us the percentage of the data results that falls EXACTLY on one given score

NormalCDF gives us the percentage of the data results that fall between a given RANGE (ex. Between 50 and 100)

NOTE: Really, the NormalCDF calls the NormalPDF for many data values and ADDS all of the results up

Example: A group of 40 people have heights that are **normally distributed**.



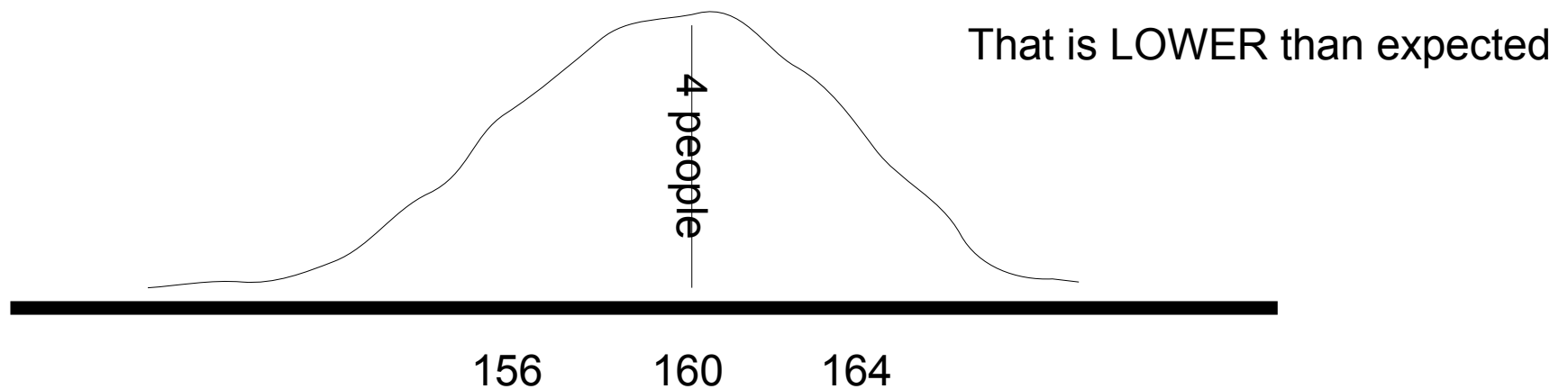
The average height is: **160 cm**  
With a std. Deviation of **4 cm**

Question: how many people are exactly at the average height?

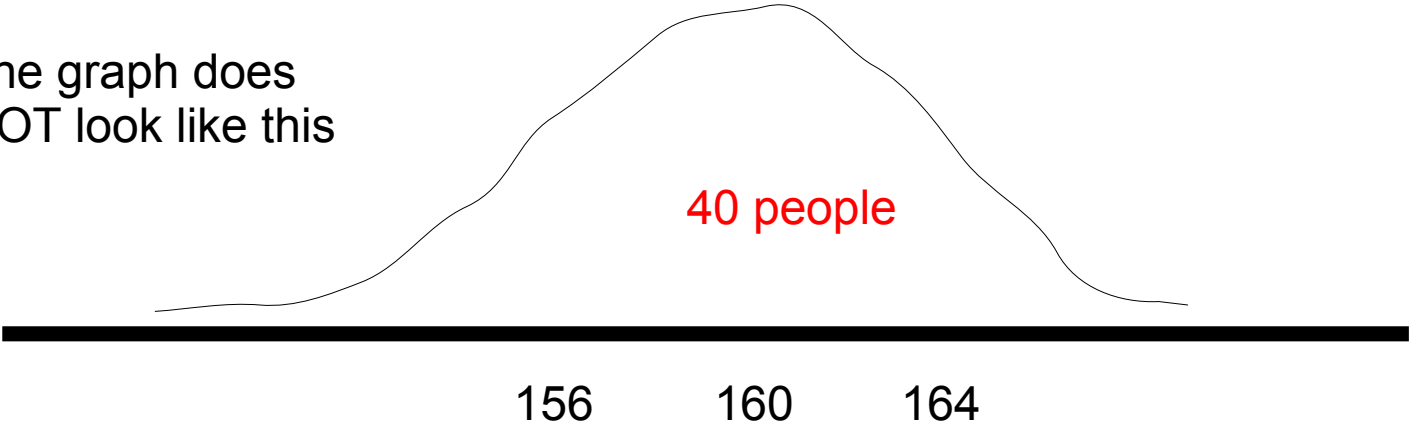
$$\text{NormalPDF}(160, 160, 4) = 0.099 \rightarrow 1\%$$

Score we are interested in      mean      Std. Deviation

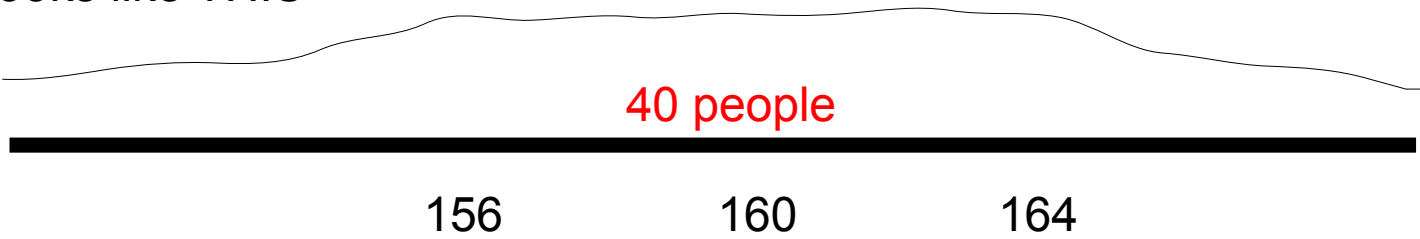
This indicates that  $(0.099)(40) = 4$  people are at the average height



The graph does NOT look like this



It looks like THIS



# What we noticed about this HEIGHT experiment is that the data was quite SPREAD OUT

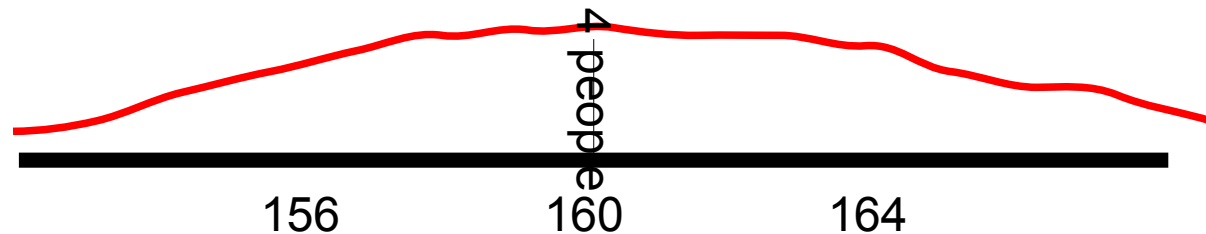
Only a few people (4) were at the exact average and almost the same were slightly above and slightly below

## QUESTION: What can you change about the experiment to make it LESS spread out

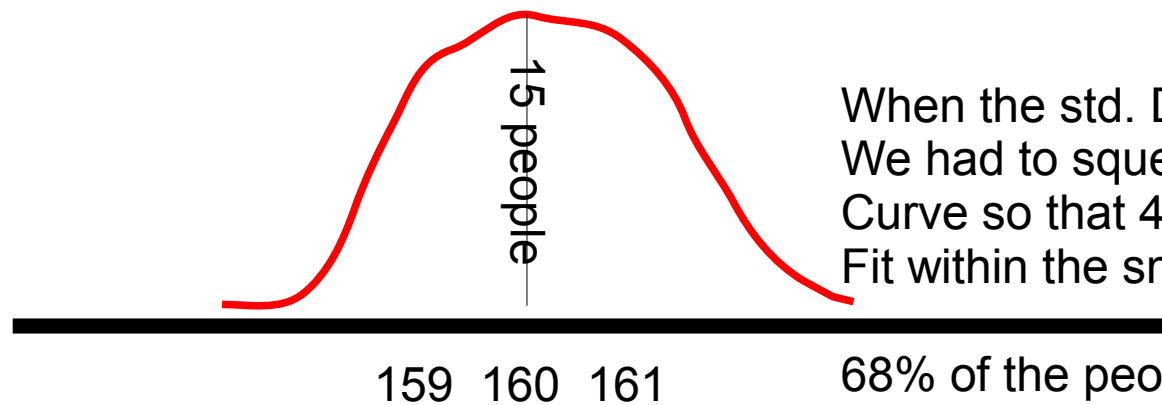
We DECREASE the standard deviation to make the data and graph Less spread out

# Example: If the Std. Deviation was 1. How Many people would be at the average Height.

When the std. Deviation was 4, there Was 4 people at the height of 160 (we used normalPDF to determine this)



When the std. Deviation became 1, We had to squeeze the entire bell Curve so that 40 people could still Fit within the smaller range



68% of the people now have to fit Between 159 and 161 height

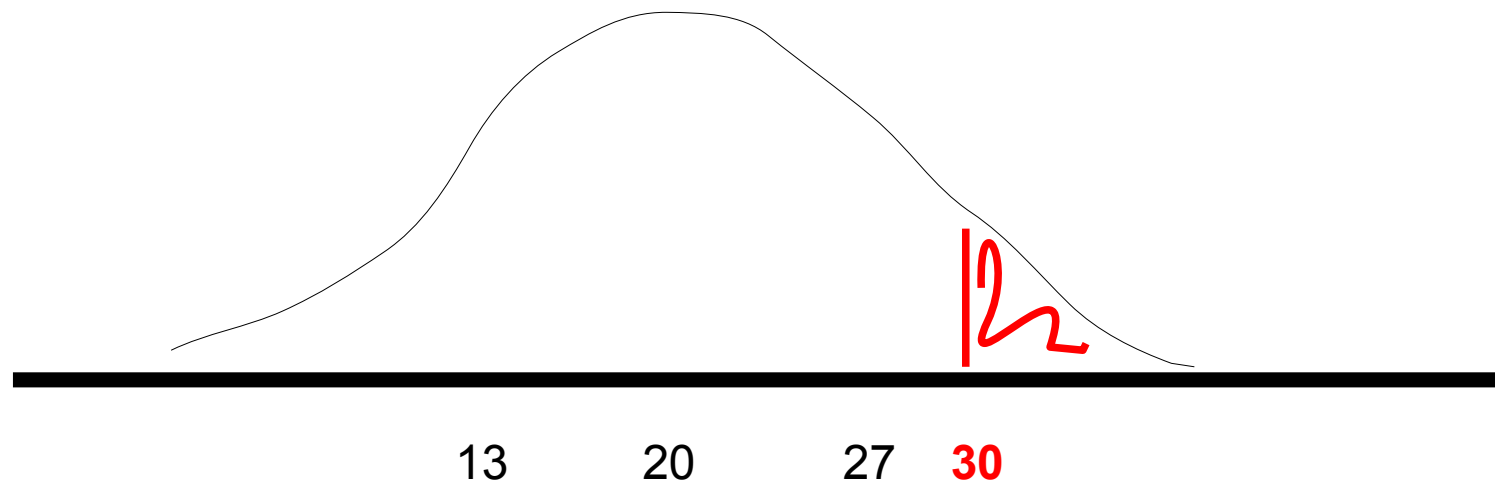
Example: Panda bears are an endangered species. There are 200 left in the world.

The life expectancy of a Panda is normally Distributed

Average life expectancy: 20 years

The std. Deviation is: 7 years

QUESTION: How many pandas can be Expected to live past 30 years old?



We use `normalCDF(30, 1000000, 20, 7)`

It doesn't matter here what number we use as long as it is large enough to be Sure ALL of the results will be included.

Here, the same percentage of pandas would live to 1000000 as would 1000 or even 100; thus we would get the same result from the `normalCDF`



Interactive writing: Describe a moment  
In today's class when you felt confused.

**What do you think caused your confusion?**