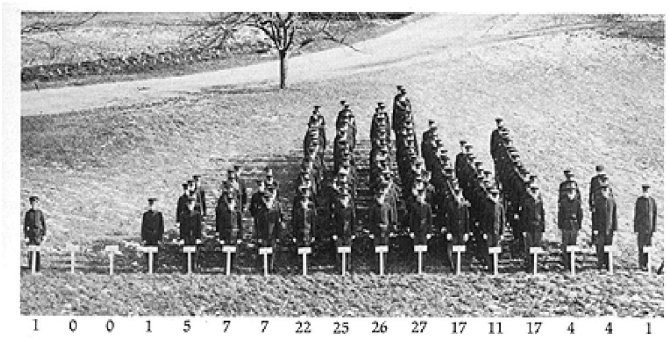
## 5.1 Continuous Probability Functions

Recall that data that can take on any value between a minimum and maximum value is called

*continuous data.*

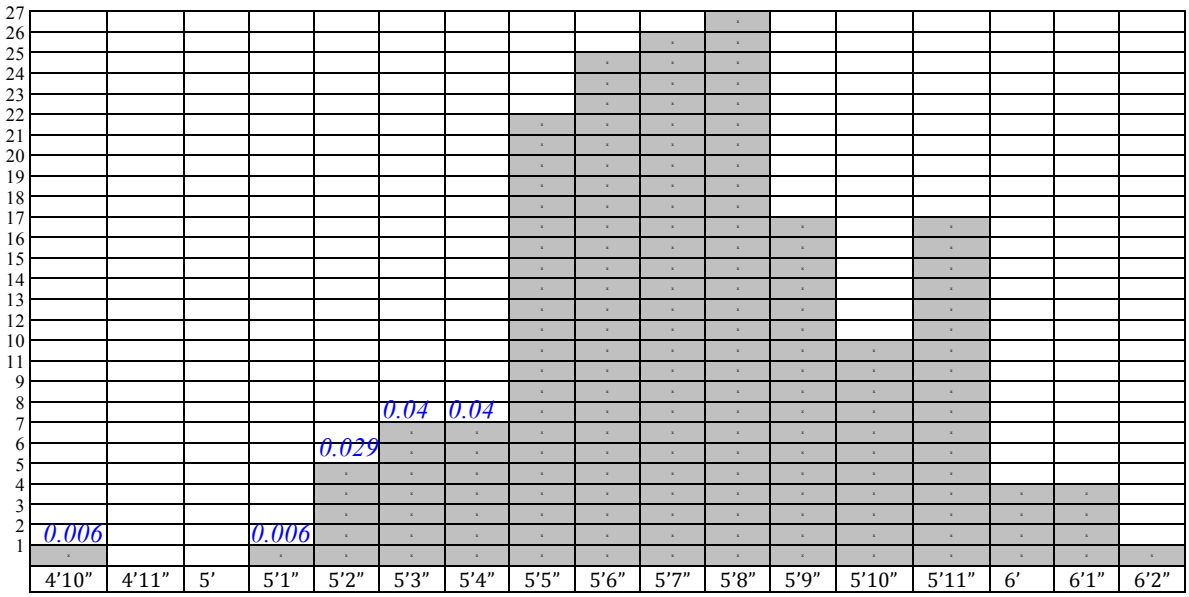
For example, the heights of 175 cadets from the Connecticut Agricultural College, ROTC are continuous data values.



| 1 | 0 | 0 | 1 | 5 | 7 | 7 | 22 | 25 | 26 | 27 | 17 | 11 | 17 | 4 | 4 | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4'10" | 4'11" | 5'0" | 5'1" | 5'2" | 5'3" | 5'4" | 5'5" | 5'6" | 5'7" | 5'8" | 5'9" | 5'10" | 5'11" | 6'0" | 6'1" | 6'2" |

**Figure 1.5**
*Differences in height in the same population:* heights of conscripts over 60 years ago. (From A. Blakeslee, *Journal of Heredity*, vol. 5, 1914.)

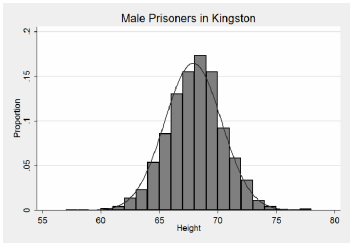
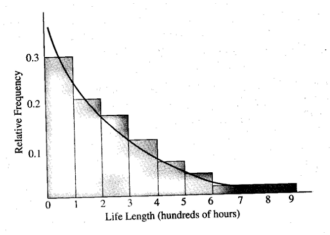
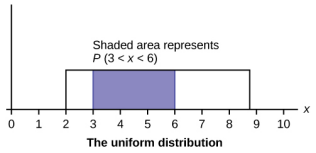
Below, is the data represented as shaded regions in a grid. The blue numbers in italics represent the relative frequencies for the first few data classes. Complete the relative frequencies for all of the data classes.




| 1. What is the total of the frequencies of each column? | 2. What is the total of the relative frequencies of each column? |
|---|---|
| We can refer to the total of the frequencies as the "area under the curve". | |

Probabilities can be determined by finding specific areas under the curve of a probability distribution.

In the following examples, the "area under the curve" represents the area bounded by the curve, the minimum data value, the maximum data value, and the horizontal axis.

| **Normal Distribution** | **Exponential Distribution** | **Uniform Distribution** |
|---|---|---|
|  |  |  |
| Example:<br>Heights of male prisoners in Kingston, Ontario | Example:<br>Life expectancy of a car battery | Example:<br>Location of where a bird will land on a certain power line |

The distribution of the heights of 175 ROTC cadets on the previous page is an example of an approximation of a normal curve. A larger sample of 1,000 cadets or more would appear "more normal". This is an example of the Law of Large Numbers. We will explore the normal curve in more detail in chapter 6.

In section 5.2 we will learn how to create and use a uniform probability distribution function.