

4.1: Populations and Samples

A **population** is the entire group of individuals or objects of interest to us. In practice, it is difficult or impossible to study every individual or object in the population.

A **sample** is a subset of the population that we can study by collecting or gathering data.

Quantities that describe populations are called **parameters**. We will explore some of these values in the future chapters on random variables.

Quantities that describe samples are called **statistics** and were investigated in the previous chapter.

Example: Math anxiety and community college students

A large community college has about 25,000 students. In a study of 85 students from college, it was determined that about 60 of the students have moderate or high math anxiety.

In this study, the population is all the students at this college. The sample is the 85 students whose math anxiety was measured

A **census** is a sample of every individual or object in the population. It is rarely possible to effectively conduct a complete census due to unavailability of data or prohibitive costs. For example, the cost of the 2010 United States census was \$13 billion to simply count people and collect basic data.⁴⁰ Keep in mind that even the US census is not perfect since there are both over-counting of some groups and under-counting of other groups.

The major goal in Statistics is to be able to make estimates or support claims about populations based on the sample measurements, a process called **statistical inference**. To be able to make a valid inference, care must be taken in collecting sample data.

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