Samples and Populations
10.6

Key Idea

Samples and Population

- A **population** is an entire group of people or objects.
- A **sample** is a part of the population.

A class is a part of an entire school.

All of the students in a school are a population.

All of the students in a class are a sample.

- You can use a sample to make an **inference**, or conclusion about a population

EXAMPLE 1 **Identifying a Population and a Sample**

An agency wants to know the opinions of Florida residents on the construction of a new road. The agency surveys 800 residents. Identify the population and the sample.

- The **population** is the Florida residents.
- The **sample** is the 800 residents surveyed.

Response	Residents
Favor road	533
Oppose road	267

- Based on the responses by the sample, what conclusion, can we make about the population? Is the population likely to favor the construction of the new road? **Yes.**

Identifying Representative Samples

- An **unbiased sample** is representative of a population. It is selected <u>at random</u> and is large enough to provide accurate data.

- A **biased sample** is not representative of a population. One or more parts of the population are favored over the others.

Identifying Representative Samples

A new power plant is being built outside of town. In each situation below, residents of the town are asked how they feel about the new power plant. Determine whether each conclusion is valid.

a. A local radio show takes calls from 500 residents. The table shows the results. The radio station concludes that most of the residents of the town oppose the new power plant. **Not valid.**

New Power Plant	
For	70
Against	425
Don't know	5

b. A news reporter randomly surveys 2 residents outside a supermarket. The graph shows the results. The reporter concludes that the residents of the town are evenly divided on the new power plant. **Not valid.**

New Power Plant

For 50%   Against 50%
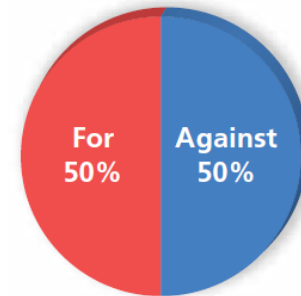
c. You randomly survey 250 residents at a shopping mall. The table shows the results. You conclude that there are about twice as many residents of the town against the new power plant than for the new power plant. **Valid.**

New Power Plant	
For	32%
Against	62%
Don't know	6%

The results of an unbiased sample are proportional to the results of the population. So, unbiased samples can be used to make predictions about the population.

For example: You ask 75 randomly chosen students how many movies they watch each week. There are 1200 students in the school. Predict the number **n** of students in the school who watch one movie each week.

Movies per Week

One movie 21

Zero movies 30

Two or more movies 24
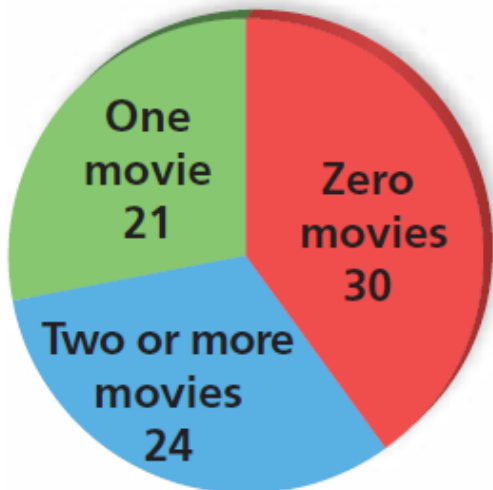
Write and solve a proportion to find n.

Sample   **Population**

$$\frac{\text{students in survey (one movie)}}{\text{number of students in survey}} = \frac{\text{students in school (one movie)}}{\text{number of students in school}}$$

$$\frac{21}{75} = \frac{n}{1200}$$

$$336 = n$$

So, about 336 students in the school watch one movie each week.