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An Introduction to Probability

How much snow will fall in the mountains this winter?

Will you win at your computer game?

What will you have for lunch on Saturday?

How many students will be sick on Monday?

Answering questions such as these is not simply a matter of chance. Mathematically, these answers can be assigned some probability of occurrence. Probability is the likelihood that something will happen, estimated as a ratio or a percentage. It is essential in making good business decisions, in research, in forecasting the weather, and in projecting sporting results.

By learning to understand probability, we can make predictions, make informed decisions, and improve our chances of living happy, fulfilled lives. For example, numbers from medical research show us which foods are likely to be carcinogenic, which foods will increase our cholesterol levels, and which foods will help us lose weight. If we use this information to determine our diets, we can reduce our chances of cancer, heart disease, high blood pressure, and obesity as we increase our chances of living longer, healthier lives.

In order to use numbers to make decisions, we must first understand them. This book was written to make probability, statistics, and graphing readily accessible so that they can be applied to everyday life.

Taking a Survey

When you like or appreciate something or someone, you may think that everyone else feels the same way you do. For example, you may like chocolate so much that you cannot imagine that anyone would not like it. The fact is, however, that not all people like chocolate. One way to find out how things are viewed by other people is to take a survey.

You cannot, of course, survey everyone to find an answer to your question; instead you survey a sample group, a portion of the population whose opinion you are seeking. The larger the sample, the more accurate your data will be. A random selection is the most unbiased way to choose a sample group. When you pick people at random, everyone has the same chance of being chosen. There are many ways to choose a random population: draw names from a hat, choose every third person to come along, take only names that begin with certain letters of the alphabet, select a certain number of people from a variety of age groups, etc.



A census is different from a sample as it polls all participants. Although it is more accurate, it is very difficult to administer, so it is seldom used. As a result, people largely rely on the data gathered from sample groups to project how large groups will respond.

It is important that the data collected in a survey is presented to others in a meaningful way. Data can serve as a basis for projecting trends, determining weather patterns, projecting health-related concerns within families, or solving simple business problems. The data from surveys can help to answer important questions.

Think of three questions that you could ask an unbiased sample in order to gather important data concerning your school and the way it operates. Write them here:

1. _____

2. _____

3. _____

Predict the results for each question before you conduct the survey.

Decide how you will determine the population of your random sample. Describe the method you will use in the space below.

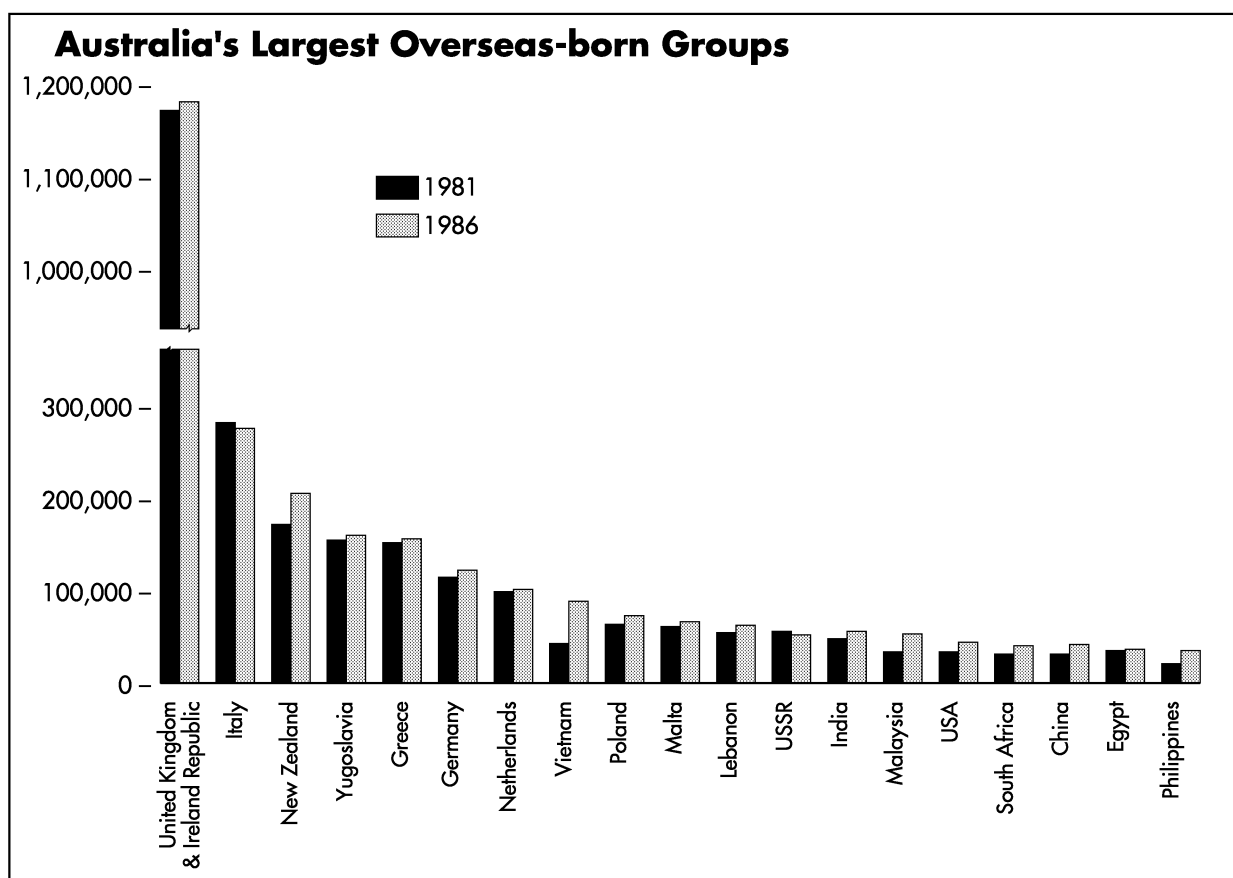
You are now ready to take your survey. Create a form that will allow you to represent the choices made by your sample population. In order to simplify the process, you may wish to preselect the choices that are available to those you survey. For example, if your question involves the amount of TV viewing time in a typical week, you may want to have such categories as “About 2 hours,” “3–7 Hours,” “10–15 Hours,” “16–24 Hours,” and “25 or More Hours.”

Attach your survey form to the back of this page.

Graphing Results

Once data gathering has taken place, results can be presented in a variety of ways. One way to present this information is pictorially through charts or graphs. There are a variety of ways to graph results.

For example, the bar graph below shows a comparison between Australia's largest overseas born groups in 1981 and 1986.



Conduct a survey of your classmates, to see where their parents were born. Graph the results. Do you have a similar pattern to the graph above?

Hint: Remember to use graph paper so that you can be neat and accurate. Colour code your graph and label it clearly.