Assignment

Write

Explain the purpose and process of taking a sample when you are interested in a characteristic of the population.

Remember

If you are estimating a parameter that is a count, rather than a percentage, you can use proportional reasoning to scale up from the ratio of the number of observations in your sample to the statistic.

Practice

The table at the end of this assignment shows the names and ages at inauguration of 45 presidents of the United States.
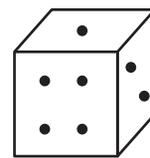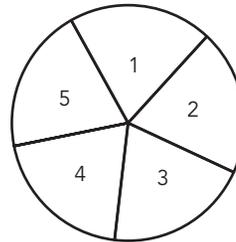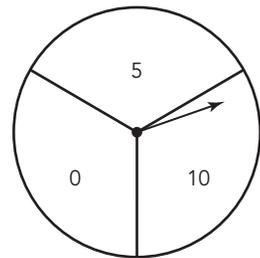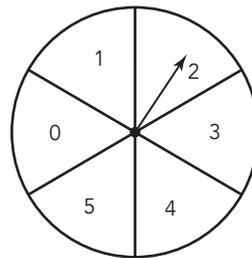
1. You want to determine the mean age of the U.S. presidents at their inaugurations. Instead of calculating the mean using all 45 presidents' ages, you will take a sample.
   a. What is the population for this situation?
   b. Select 10 presidents whose ages best represent the mean age of a U.S. president at inauguration.
   c. Record the ages of these presidents.
   d. Explain why you chose these presidents.
   e. Is this a random sample? Explain your reasoning.
   f. Calculate the mean age of the presidents you selected. Round to the nearest year.
   g. Record the mean age you calculated and the mean age your classmates calculated on a dot plot.
   h. Describe the distribution of the dot plot in part (g).
2. You decide to use another method to choose presidents.
   a. Randomly select 10 presidents. Record the ages of these presidents.
   b. Is this a random sample? Explain your reasoning.
   c. Calculate the mean age of the presidents you selected. Round to the nearest year.
   d. Is the mean age of the 10 presidents you selected a statistic or parameter? Explain your reasoning.
   e. Record the mean age you calculated and the mean age your classmates calculated on a dot plot.
   f. Describe the distribution of the line plot in part (e).
   g. Calculate the actual mean age at inauguration of all 45 presidents. Round to the nearest year. Plot this age with an A on the dot plot in part (e).
   h. Calculate the percent error between the statistic from your random sample and the true mean age.
3. Why is a random sample more desirable than a sample that is not chosen randomly?

Stretch

Design a simulation that takes 100 samples of size 25 from a population in which 42% of the members of the population have a particular characteristic (e.g., blood group). Formulate a question and collect the data. For each sample, compute the percentage of observations with the given characteristic. Then analyze your results: summarize your sample percentages in a table and on a dot plot. Interpret the results: What are some predictions or generalizations about the population parameter based on your sample?

Review

1. Ms. Patel, the sponsor of the spirit team, wants to survey the team about upcoming events. Which sampling methods would result in representative samples? Explain your reasoning.
   a. Surveying the first 5 members who arrive at the volleyball game.
   b. Drawing 5 names from a box that contains the names of all the members and surveying those 5 members.
   c. Surveying the 5 members who have been members the longest.
2. Mike spins each spinner one time. He determines the product of the two numbers.
   a. Create an array to illustrate the possible products.
   b. What is the sample space?
   c. Determine P(multiple of 10).
   d. Determine $P(0)$.
3. A game requires spinning a spinner numbered 1 through 5 and rolling a six-sided number cube.
   a. Determine the possible outcomes for playing the game.
   b. What is the probability of spinning an even number and rolling an even number?
   c. What is the probability of spinning a 5 or rolling a 5?
4. Evaluate the expression $1.2(x + 0.9) - 10.8$ for each unknown.
   a. $x = -5.5$ b. $x = 8.9$

Presidents of the United States			
President	Age at Inauguration	President	Age at Inauguration
George Washington	57	Franklin Pierce	48
John Adams	61	James Buchanan	65
Thomas Jefferson	57	Abraham Lincoln	52
James Madison	57	Andrew Johnson	56
James Monroe	58	Ulysses S. Grant	46
John Quincy Adams	57	Rutherford B. Hayes	54
Andrew Jackson	61	James A. Garfield	49
Martin Van Buren	54	Chester A. Arthur	51
William Henry Harrison	68	Grover Cleveland	47
John Tyler	51	Benjamin Harrison	55
James K. Polk	49	Grover Cleveland	55
Zachary Taylor	64	John F. Kennedy	43
William McKinley	54	Lyndon B. Johnson	55
Theodore Roosevelt	42	Richard Nixon	56
William Howard Taft	51	Gerald Ford	61
Woodrow Wilson	56	Jimmy Carter	52
Warren G. Harding	55	Ronald Reagan	69
Calvin Coolidge	51	George H.W. Bush	64
Herbert Hoover	54	Bill Clinton	46
Franklin D. Roosevelt	51	George W. Bush	54
Harry S. Truman	60	Barack Obama	47
Dwight D. Eisenhower	62	Donald Trump	70
Millard Fillmore	50		