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home / math / sample size calculator This calculator computes the minimum number of necessary samples to meet the desired statistical constraints. Find Out The Margin of Error This calculator gives out the margin of error or confidence interval of observation or survey. RelatedStandard Deviation Calculator | Probability Calculator In statistics, information is often inferred about a population by studying a finite number of individuals from that population, i.e. the population is sampled, and it is assumed that characteristics of the sample are representative of the overall population. For the following, it is assumed that there is a population of individuals where some proportion, p, of the population is distinguishable from the other 1-p in some way; e.g., p may be the proportion of individuals who have brown hair, while the remaining 1-p have black, blond, red, etc. Thus, to estimate p in the population, a sample of n individuals could be taken from the population, and the sample proportion, \hat{p} , calculated for sampled individuals who have brown hair. Unfortunately, unless the full population is sampled, the estimate \hat{p} most likely won't equal the true value p, since \hat{p} suffers from sampling noise, i.e., it depends on the particular individuals that were sampled. However, sampling statistics can be used to calculate what are called confidence intervals, which are an indication of how close the estimate \hat{p} is to the true value p. Statisticians refer to a Random Sample The uncertainty in a given random sample (namely that the proportion estimate, \hat{p} , is a good, but not perfect, approximation for the true proportion p) can be summarized by saying that the estimate \hat{p} is normally distributed with mean p and variance $p(1-p)/n$. For an explanation of why the sample estimate is normally distributed, study the Central Limit Theorem. As defined below, confidence level, confidence intervals, and sample sizes are all calculated with respect to this sampling distribution. In short, the confidence interval gives an interval around p in which an estimate \hat{p} is "likely" to be. The confidence level gives just how "likely" this is – e.g., a 95% confidence level indicates that it is expected that an estimate \hat{p} lies in the confidence interval for 95% of the random samples that could be taken. The confidence interval depends on the sample size, n (the variance of the sample distribution is inversely proportional to n, meaning that the estimate gets closer to the true proportion as n increases); thus, an acceptable error rate in the estimate can also be set, called the margin of error, ϵ , and solved for the sample size required for the chosen confidence interval to be smaller than ϵ ; a calculation known as "sample size calculation." Confidence Level The confidence level is a measure of certainty regarding how accurately a sample reflects the population being studied within a chosen confidence interval. The most commonly used confidence levels are 90%, 95%, and 99%, which each have their own corresponding z-scores (which can be found using an equation or widely available tables like the one provided below) based on the chosen confidence level. Note that using z-scores assumes that the sampling distribution is normally distributed, as described above in "Statistics of a Random Sample." Given that an experiment or survey is repeated many times, the confidence level essentially indicates the percentage of the time that the resulting interval found from repeated tests will contain the true result. Confidence Interval In statistics, a confidence interval is an estimated range of likely values for a population parameter, for example, 40 \pm 2 or 40 \pm 5%. Taking the commonly used 95% confidence level as an example, if the same population were sampled multiple times, and interval estimates made on each occasion, in approximately 95% of the cases, the true population parameter would be contained within the interval. Note that the 95% probability refers to the reliability of the estimation procedure and not to a specific interval. Once an interval is calculated, it either contains or does not contain the population parameter of interest. Some factors that affect the width of a confidence interval include: size of the sample, confidence level, and variability within the sample. There are different equations that can be used to calculate confidence intervals depending on factors such as whether the standard deviation is known or smaller samples (n where z is z score \hat{p} is the population proportion n and n' are sample size N is the population size Within statistics, a population is a set of events or elements that have some relevance regarding a given question or experiment. It can refer to an existing group of objects, systems, or even a hypothetical group of objects. Most commonly, however, population is used to refer to a group of people, whether they are the number of employees in a company, number of people within a certain age group of some geographic area, or number of students in a university's library at any given time. It is important to note that the equation needs to be adjusted when considering a finite population, as shown above. The (N-n)/(N-1) term in the finite population equation is referred to as the finite population correction factor, and is necessary because it cannot be assumed that all individuals in a sample are independent. For example, if the study population involves 10 people in a room with ages ranging from 1 to 100, and one of those chosen has an age of 100, the next person chosen is more likely to have a lower age. The finite population correction factor accounts for factors such as these. Refer below for an example of calculating a confidence interval with an unlimited population. EX: Given that 120 people work at Company Q, 85 of which drink coffee daily, find the 99% confidence interval of the true proportion of people who drink coffee at Company Q on a daily basis. Sample Size Calculation Sample size is a statistical concept that involves determining the number of observations or replicates (the repetition of an experimental condition used to estimate the variability of a phenomenon) that should be included in a statistical sample. It is an important aspect of any empirical study requiring that inferences be made about a population based on a sample. Essentially, sample sizes are used to represent parts of a population chosen for any given survey or experiment. To carry out this calculation, set the margin of error, ϵ , or the maximum distance desired for the sample estimate to deviate from the true value. To do this, use the confidence interval equation above, but set the term to the right of the \pm sign equal to the margin of error, and solve for the sample size, n. The equation for calculating sample size is shown below, where z is the z score ϵ is the margin of error N is the population size \hat{p} is the population proportion EX: Determine the sample size necessary to estimate the proportion of people shopping at a supermarket in the U.S. that identify as vegan with 95% confidence, and a margin of error of 5%. Assume a population proportion of 0.5, and unlimited population size. Remember that z for a 95% confidence level is 1.96. Refer to the table provided in the confidence level section for z scores of a range of confidence levels. Thus, for the case above, a sample size of at least 385 people would be necessary. In the above example, some studies estimate that approximately 6% of the U.S. population identify as vegan, so rather than assuming 0.5 for \hat{p} , 0.06 would be used. If it was known that 40 out of 500 people that entered a particular supermarket on a given day were vegan, \hat{p} would then be 0.08. Sample size is a research term used for defining the number of individuals included in a research study to represent a population. The sample size references the total number of respondents included in a study, and the number is often broken down into sub-groups by demographics such as age, gender, and location so that the total sample achieves represents the entire population. Determining the appropriate sample size is one of the most important factors in statistical analysis. If the sample size is too small, it will not yield valid results or adequately represent the realities of the population being studied. On the other hand, while larger sample sizes are desirable, they can also be costly and time-consuming. Therefore, finding the right sample size is crucial for ensuring the reliability and validity of research findings. Before conducting a study, researchers must carefully consider various factors that can impact the reliability and validity of results, including sampling and non-sampling errors. When thinking about sample size, the two measures of error that are almost always synonymous with sample sizes are the confidence interval and the confidence level. Confidence Interval (Margin of Error) Confidence intervals measure the degree of uncertainty or certainty in a sampling method and how much uncertainty there is with any particular statistic. In simple terms, the confidence interval tells you how confident you can be that the results from a study (to which you would expect to find if it were possible to survey the entire population being studied. The confidence interval is usually a plus or minus (\pm) figure. For example, if your confidence interval is 6 and 60% percent of your sample picks an answer, you can be confident that if you had asked the entire population, between 54% (60-6) and 66% (60+6) would have picked that answer. Confidence Level The confidence level refers to the percentage of probability, or certainty that the confidence interval would contain the true population parameter when you draw a random sample
many times. It is expressed as a percentage and represents how often the percentage of the population who would pick an answer lies within the confidence interval. For example, a 99% confidence level means that should you repeat an experiment or survey over and over again, 99 percent of the time, your results will match the results you get from a population. The larger your sample size, the more confident you can be that their answers truly reflect the population. In other words, the larger your sample for a given confidence level, the smaller your confidence interval. Standard Deviation Another critical measure when determining the sample size is the standard deviation, which measures a data set's distribution from its mean. In calculating the sample size, the standard deviation is useful in estimating how much the responses you receive will vary from each other. The standard deviation, and sample sizes are all calculated with respect to this sampling distribution. In short, the confidence interval gives an interval around p in which an estimate \hat{p} is "likely" to be. The confidence level gives just how "likely" this is – e.g., a 95% confidence level indicates that it is expected that an estimate \hat{p} lies in the confidence interval for 95% of the random samples that could be taken. The confidence interval depends on the sample size, n (the variance of the sample distribution is inversely proportional to n, meaning that the estimate gets closer to the true proportion as n increases); thus, an acceptable error rate in the estimate can also be set, called the margin of error, ϵ , and solved for the sample size required for the chosen confidence interval to be smaller than ϵ ; a calculation known as "sample size calculation." Confidence Level The confidence level is a measure of certainty regarding how accurately a sample reflects the population being studied within a chosen confidence interval. 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In the above example, some studies estimate that approximately 6% of the U.S. population identify as vegan, so rather than assuming 0.5 for \hat{p} , 0.06 would be used. If it was known that 40 out of 500 people that entered a particular supermarket on a given day were vegan, \hat{p} would then be 0.08. Sample size calculator Confidence Level: 90%95%99% Population Size: Margin of Error: 1%2%3%4%5%6%7%8%9%10% Ideal Sample Size: What proportion of the target population do you need to interview to get results representative of the target population with the level of confidence that you are willing to accept? Introduction to sample size How can you calculate sample size, reduce the margin of error and produce surveys with statistically significant results? In this short guide, we explain how you can improve your surveys and showcase some of the tools and resources you can leverage in the process. But first, when it comes to market research, how many people do you need to interview to get results that are accurate, trustworthy and that can be relied upon? The answer to this question is: it depends on what you're trying to achieve. There are a number of factors that can influence the sample size you need, including the type of research you're conducting, the level of confidence you want, the margin of error you're willing to accept, and the population size you're studying. In a survey, study, or experiment, in surveys with large populations, sample size is incredibly important. The reason for this is because it's unrealistic to get answers or results from everyone - instead, you can take a random sample of individuals that represent the population as a whole. For example, we might want to compare the performance of long-distance runners that eat Weetabix for breakfast versus those who don't. Since it's impossible to track the dietary habits of every long-distance runner across the globe, we would have to focus on a segment of the survey population. This might mean selecting 1,000 runners for the study. How can sample size influence results? That said, no matter how diligent we are with our selection, there will always be some margin of error (also referred to as confidence interval) in the study results, that's because we can't speak to every long-distance runner or be confident of how Weetabix influences (in every possible scenario), the performance of long-distance runners. This is known as a "sampling error." Larger sample sizes will help to mitigate the margin of error, helping to provide more statistically significant and meaningful results. In other words, a more accurate picture of how eating Weetabix can influence the performance of long-distance runners. So what do you need to know when calculating the minimum sample size needed for a research project? What you need to know to calculate survey sample size Confidence interval (or margin of error) The confidence interval is the plus-or-minus figure that represents the accuracy of the reported. Consider the following example: A Canadian national sample showed "Who Canadians spend their money on for Mother's Day." Eighty-two percent of Canadians expected to buy gifts for their mom, compared to 20 percent for their wife and 5 percent for their mother-in-law. In terms of spending, Canadians expect to spend \$93 on their Mother's Day versus \$58 on their mother. International findings are accurate, plus or minus 2.75 percent, 19 times out of 20. For example, if you use a confidence interval of 2.75 percent, you can be "confident" (95% or 99%) that if you had asked the question to ALL CANADIANS, some results between 79.25% (82%-2.75%) and 84.75% (82%+2.75%) would be picked. The answer. Confidence interval is also called the "margin of error." Are you needing to understand how the two calculations correlate? Confidence level The confidence level tells you how confident you are of this result. It is expressed as a percentage of times that different samples (if repeated samples were drawn) would produce this result. The 95% confidence level means that 19 times out of twenty that results would fall in this - + interval confidence interval. The 95% confidence level is the most commonly used. When you put the confidence level and the confidence interval together, you can say that you are 95% (19 out of 20) sure that the true percentage of the population that will "buy a gift for mom" is between 79.25% and 84.75%. Wider confidence intervals increase the certainty that the true answer is within the range specified. These wider confidence intervals come from smaller sample sizes. When the costs of an error is extremely high (a multi-million dollar decision is at stake) the confidence interval should be kept small. This can be done by increasing the sample size. Population size Population size is the total amount of people in the group you're trying to study. If you were taking a random sample of people across the U.K., then your population size would be just over 68 million (as of 09 August 2021). Standard deviation This refers to how much individual responses will vary between each other and the mean. If there's a low standard deviation, scores will be clustered near the mean with minimal variation. A higher standard deviation means that when plotted on a graph, responses will be more spread out. Standard deviation is expressed as a decimal, and 0.5 is considered a "good" standard deviation to set to ensure a sample size that represents the population. How can you calculate sample size? After
you've considered the above variables, you should have everything required to calculate your sample size. However, if you don't know your population size, you can still calculate your sample size. To do this, you need to piece of information: a z-score and the sample size formula. What is a z-score? A z-score is a statistical measure that represents a value or score relative to the mean of a distribution. It is calculated by subtracting the mean from the value and dividing by the standard deviation. In other words, the z-score is simply the raw score minus the population mean and divided by the population standard deviation. Using a sample size calculation Once you have your z-score, you can fill out your sample size formula, which is: Is there an easier way to calculate sample size? If you want an easier option, Qualtrics offers an online sample size calculator that can help you determine your ideal survey sample size in seconds. Just put in the confidence level, population size, margin of error, and the perfect sample size is calculated for you. Best-practice tips for sample size There are lots of variables to consider when it comes to generating a specific sample size. That said, there are a few best-practice tips (or rules) to ensure you get the best possible results: 1) Balance cost and confidence level To increase confidence level or reduce the margin of error, you have to increase your sample size. Larger sizes almost invariably lead to higher costs. Take the time to consider what results you want from your surveys and what role it plays in your overall campaigns. 2) You don't always need statistically significant results Depending on your target audience, you may not be able to get enough responses (or a large enough sample size) to achieve "statistically significant" results. If it's for your own research and not a wider study, it might not be that much of a problem, but remember that any feedback you get from your surveys is important. It might not be statistically significant, but it can aid your activities going forward. Ultimately, you should treat this on a case-by-case basis. Survey samples can still give you valuable answers without having sample sizes that represent the general population. But more on this in the section below. 3) Ask open-ended questions Yes and no questions provide certainty, but open-ended questions provide insights you can't get from yes/no questions. For example, if you're asking about customer satisfaction, asking "How satisfied are you with our service?" will give you a range of responses, while asking "Are you satisfied?" will only give you yes/no answers. 4) Use a variety of survey types and methods. Different survey types and methods can provide different insights. For example, using a mix of online surveys, focus groups, and interviews can give you a more comprehensive view of your customers' needs and preferences. 5) Test your surveys before you launch. Make sure your surveys are easy to use and that they provide the information you need. 6) Consider the cost of your survey. Make sure the cost of your survey is worth the information you will gain. 7) Use a sample size calculator. There are many online sample size calculators available. Choose one that fits your needs and use it to determine the sample size you need. 8) Consult with a statistician. If you're unsure about how to calculate sample size, consult with a statistician. They can help you determine the sample size you need based on your specific needs and goals. 9) Use a sample size calculator. There are many online sample size calculators available. Choose one that fits your needs and use it to determine the sample size you need. 10) Consult with a statistician. 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Formula? If the total population size is not given in the problem, what formula would be applicable? If the population size is not given, then a t-distribution formula is applicable. Question What is t- distribution formula ? The t-distribution formula can be used to get the mean of a normally distributed population. Question What is the name of the sample size formula? The sample size formula is also known as Cochran's formula, named after the person who developed it. Ask a Question Advertisement 1 This article was reviewed by Joseph Meyer. Joseph Meyer is a High School Math Teacher based in Pittsburgh, Pennsylvania. He is an educator at City Charter High School, where he has been teaching for over 7 years. Joseph is also the founder of Sandbox Math, an online learning community dedicated to helping students succeed in Algebra. His site is set apart by its focus on fostering genuine comprehension through step-by-step understanding (instead of just getting the correct final answer), enabling learners to identify and overcome misunderstandings and confidently take on any test they face. He received his MA in Physics from Case Western Reserve University and his BA in Physics from Baldwin Wallace University. This article has been viewed 511,411 times. Co-authors: 12 Updated: April 5, 2025 Views: 511,411 Categories: Probability and Statistics Print Send fan mail to authors Thanks to all authors for creating a page that has been read 511,411 times. The formulas and the references to them helps researchers to use them and to cite the references. The solved examples help in calculating the sample size easily. "... more Share your story Download Article Learn all the calculations you need with our complete guide Download Article Scientific studies often rely on surveys distributed among a sample of some total population. Your sample will need to include a certain number of people, however, if you want it to accurately reflect the conditions of the overall population it's meant to represent. To calculate your necessary sample size, you'll need to determine several set values and plug them into an appropriate formula. 1 Know your population size. Population size refers to the total number of people within your demographic. For larger studies, you can use an approximated value instead of the precise number.[1] Precision has a greater statistical impact when you work with a smaller group. For instance, if you wish to perform a survey among members of a local organization or employees of a small business, the population size should be accurate within a dozen or so people.[2] Larger surveys allow for a greater deviance in the actual population. For example, if your demographic includes everyone living in the United States, you could estimate the size to roughly 320 million people, even though the actual value may vary by hundreds of thousands. 2 Determine your margin of error. Margin of error, also referred to as "confidence interval," refers to the amount of error you wish to allow in your results.[3] The margin of error is a percentage the indicates how close your sample results will be to the true value of the overall population discussed in your study. Smaller margin of errors will result in more accurate answers, but choosing a smaller margin of error will also require a larger sample. When the results of a survey are presented, the margin of error usually appears as a plus or minus percentage. For example: "35% of people agree with option A, with a margin of error of +/- 5%". In this example, the margin of error essentially indicates that, if the entire population were asked the same poll question, you are "confident" that somewhere between 30% (35 - 5) and 40% (35 + 5) would agree with option A. Advertisement 3 Set your confidence level. Confidence level is closely related to confidence interval (margin of error). This value measures your degree of certainty regarding how well a sample represents the overall population within your chosen margin of error.[4] In other words, choosing a confidence level of 95% allows you to claim that you 95% certain that your results accurately fall within your chosen margin of error. A larger confidence level indicates a greater degree of accuracy, but it will also require a larger sample. 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This is the worst case scenario percentage, so sticking with this value will guarantee that your calculated sample size is large enough to accurately represent the overall population within your confidence interval and confidence level. 5 Find your Z-score. The Z-score is a constant value automatically set based on your confidence level. It indicates the "standard normal score," or the number of standard deviations between any selected value and the average/mean of the population.[6] You can calculate z-scores by hand, look for an online calculator, or find your z-score on a z-score table. Each of these methods can be fairly complex, however. Since confidence levels are fairly standardized, most researchers simply memorize the necessary z-score for the most common confidence levels: 80% confidence => 1.28 z-score 85% confidence => 1.44 z-score 90% confidence => 1.65 z-score 95% confidence => 1.96 z-score 99% confidence => 2.58 z-score Advertisement 1 Look at the equation.[7] If you have a small to moderate population and know all of the key values, you should use the standard formula. The standard formula for sample size is: Sample Size = (z^2 * p(1-p) / e^2 / 1 + (z^2 * p(1-p) / e^2 * N) N = population size z = z-score e = margin of error p = standard of deviation 2 Plug in your values. Replace the variable placeholders with the numerical values that actually apply to your specific survey. Example: Determine the ideal survey size for a population size of 425 people. Use a 99% confidence level, a 50% standard of deviation, and a 5% margin of error. For 99% confidence, you would have a z-score of 2.58. This means that: N = 425 z = 2.58 e = 0.05 p = 0.5 3 Do the math. Solve the equation using the newly inserted numerical values. The solution represents your necessary sample size. Example: Sample Size = (z^2 * p(1-p) / e^2 / 1 + (z^2 * p(1-p) / e^2 * N) = (2.582 * 0.5(1-0.5) / 0.052 / 1 + (2.582 * 0.5(1-0.5) / 0.052 * 425) = (6.6564 * 0.25) / 0.0025 / 1 + (6.6564 * 0.25) / 1.0625) = 665 / 2.5663 = 259.39(final answer) Advertisement 1 Examine the formula.[8] If you have a very large population or an unknown one, you'll need to use a secondary formula. If you still have values for the remainder of the variables, use the equation: Sample Size = (z^2 * p(1-p) / e^2 z = z-score e = margin of error p = standard of deviation Note that this equation is merely the top half of the full formula. 2 Plug your values into the equation. Replace each variable placeholder with the numerical values chosen for your survey. Example: Determine the necessary survey size for an unknown population with a 90% confidence level, 50% standard of deviation, a 3% margin of error. For 90% confidence, use the z-score would be 1.65. This means that: z = 1.65 e = 0.03 p = 0.5 3 Do the math. Plug your values into the equation. Replace each variable placeholder with the numerical values chosen for your survey. Example: Determine the necessary survey size for a population size of 240, allowing for a 4% margin of error. This means that: 3 Do the math. Solve the equation using your survey-specific numbers. The answer you arrive at should be your necessary survey size.[10] Example: Sample Size = N / (1 + N*e^2) = 240 / (1 + 240 * 0.042) = 240 / (1 + 240 * 0.0016) = 240 / (1 + 0.384) = 240 / 1.384 = 173.41 (final answer) Advertisement Add New Question Question If the total population size is not given in the problem, what formula will apply? If the population size is not given, then a t-distribution formula is applicable. 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He received his MA in Physics from Case Western Reserve University and his BA in Physics from Baldwin Wallace University. This article has been viewed 511,411 times. Co-authors: 12 Updated: April 5, 2025 Views: 511,411 Categories: Probability and Statistics Print Send fan mail to authors Thanks to all authors for creating a page that has been read 511,411 times. The formulas and the references to them helps researchers to use them and to cite the references. The solved examples help in calculating the sample size easily. "... more Share your story Download Article Learn all the calculations you need with our complete guide Download Article Scientific studies often rely on surveys distributed among a sample of some total population. Your sample will need to include a certain number of people, however, if you want it to accurately reflect the conditions of the overall population it's meant to represent. 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Question What is t- distribution formula ? The t-distribution formula can be used to get the mean of a normally distributed population. Question What is the name of the sample size formula? The sample size formula is also known as Cochran's formula, named after the person who developed it. Ask a Question Advertisement 1 This article was reviewed by Joseph Meyer. Joseph Meyer is a High School Math Teacher based in Pittsburgh, Pennsylvania. He is an educator at City Charter High School, where he has been teaching for over 7 years. Joseph is also the founder of Sandbox Math, an online learning community dedicated to helping students succeed in Algebra. His site is set apart by its focus on fostering genuine comprehension through step-by-step understanding (instead of just getting the correct final answer), enabling learners to identify and overcome misunderstandings and confidently take on any test they face. He received his MA in Physics from Case Western Reserve University and his BA in Physics from Baldwin Wallace University. This article has been viewed 511,411 times. Co-authors: 12 Updated: April 5, 2025 Views: 511,411 Categories: Probability and Statistics Print Send fan mail to authors Thanks to all authors for creating a page that has been read 511,411 times. The formulas and the references to them helps researchers to use them and to cite the references. The solved examples help in calculating the sample size easily. "... more Share your story Download Article Learn all the calculations you need with our complete guide Download Article Scientific studies often rely on surveys distributed among a sample of some total population. Your sample will need to include a certain number of people, however, if you want it to accurately reflect the conditions of the overall population it's meant to represent. To calculate your necessary sample size, you'll need to determine several set values and plug them into an appropriate formula. 1 Know your population size. Population size refers to the total number of people within your demographic. For larger studies, you can use an approximated value instead of the precise number.[1] Precision has a greater statistical impact when you work with a smaller group. For instance, if you wish to perform a survey among members of a local organization or employees of a small business, the population size should be accurate within a dozen or so people.[2] Larger surveys allow for a greater deviance in the actual population. For example, if your demographic includes everyone living in the United States, you could estimate the size to roughly 320 million people, even though the actual value may vary by hundreds of thousands. 2 Determine your margin of error. Margin of error, also referred to as "confidence interval," refers to the amount of error you wish to allow in your results.[3] The margin of error is a percentage the indicates how close your sample results will be to the true value of the overall population discussed in your study. Smaller margin of errors will result in more accurate answers, but choosing a smaller margin of error will also require a larger sample. When the results of a survey are presented, the margin of error usually appears as a plus or minus percentage. For example: "35% of people agree with option A, with a margin of error of +/- 5%". In this example, the margin of error essentially indicates that, if the entire population were asked the same poll question, you are "confident" that somewhere between 30% (35 - 5) and 40% (35 + 5) would agree with option A. Advertisement 3 Set your confidence level. Confidence level is closely related to confidence interval (margin of error). This value measures your degree of certainty regarding how well a sample represents the overall population within your chosen margin of error.[4] In other words, choosing a confidence level of 95% allows you to claim that you 95% certain that your results accurately fall within your chosen margin of error. A larger confidence level indicates a greater degree of accuracy, but it will also require a larger sample. The most common confidence levels are 90% confident, 95% confident, and 99% confident. Setting a confidence level of 95% for the example stated in the margin of error step would mean that you are 95% certain that 30% to 40% of the total concerned population would agree with option A of your survey. 4 Specify your standard of deviation. The standard of deviation indicates how much variation you expect among your responses.[5] Extreme answers are more likely to be accurate than moderate results. Plainly stated, if 99% of your survey responses answer "Yes" and only 1% answer "No," the sample probably represents the overall population very accurately. On the other hand, if 45% answer "Yes" and 55% answer "No," there is a greater chance of error. Since this value is difficult to determine you give the actual survey, most researchers set this value at 0.5 (50%). This is the worst case scenario percentage, so sticking with this value will guarantee that your calculated sample size is large enough to accurately represent the overall population within your confidence interval and confidence level. 5 Find your Z-score. The Z-score is a constant value automatically set based on your confidence level. It indicates the "standard normal score," or the number of standard deviations between any selected value and the average/mean of the population.[6] You can calculate z-scores by hand, look for an online calculator, or find your z-score on a z-score table. Each of these methods can be fairly complex, however. Since confidence levels are fairly standardized, most researchers simply memorize the necessary z-score for the most common confidence levels: 80% confidence => 1.28 z-score 85% confidence => 1.44 z-score 90% confidence => 1.65 z-score 95% confidence => 1.96 z-score 99% confidence => 2.58 z-score Advertisement 1 Look at the equation.[7] If you have a small to moderate population and know all of the key values, you should use the standard formula. The standard formula for sample size is: Sample Size = (z^2 * p(1-p) / e^2 / 1 + (z^2 * p(1-p) / e^2 * N) N = population size z = z-score e = margin of error p = standard of deviation 2 Plug in your values. Replace the variable placeholders with the numerical values that actually apply to your specific survey. Example: Determine the ideal survey size for a population size of 425 people. Use a 99% confidence level, a 50% standard of deviation, and a 5% margin of error. For 99% confidence, you would have a z-score of 2.58. This means that: N = 425 z = 2.58 e = 0.05 p = 0.5 3 Do the math. Solve the equation using the newly inserted numerical values. The solution represents your necessary sample size. Example: Sample Size = (z^2 * p(1-p) / e^2 / 1 + (z^2 * p(1-p) / e^2 * N) = (2.582 * 0.5(1-0.5) / 0.052 / 1 + (2.582 * 0.5(1-0.5) / 0.052 * 425) = (6.6564 * 0.25) / 0.0025 / 1 + (6.6564 * 0.25) / 1.0625) = 665 / 2.5663 = 259.39(final answer) Advertisement 1 Examine the formula.[8] If you have a very large population or an unknown one, you'll need to use a secondary formula. If you still have values for the remainder of the variables, use the equation: Sample Size = (z^2 * p(1-p) / e^2 z = z-score e = margin of error p = standard of deviation Note that this equation is merely the top half of the full formula. 2 Plug your values into the equation. Replace each variable placeholder with the numerical values chosen for your survey. Example: Determine the necessary survey size for an unknown population with a 90% confidence level, 50% standard of deviation, a 3% margin of error. For 90% confidence, use the z-score would be 1.65. This means that: z = 1.65 e = 0.03 p = 0.5 3 Do the math. Plug your values into the equation. Replace each variable placeholder with the numerical values chosen for your survey. Example: Determine the necessary survey size for a population size of 240, allowing for a 4% margin of error. This means that: 3 Do the math. Solve the equation using your survey-specific numbers. The answer you arrive at should be your necessary survey size.[10] Example: Sample Size = N / (1 + N*e^2) = 240 / (1 + 240 * 0.042) = 240 / (1 + 240 * 0.0016) = 240 / (1 + 0.384) = 240 / 1.384 = 173.41 (final answer) Advertisement Add New Question Question If the total population size is not given in the problem, what formula will apply? If the population size is not given, then a t-distribution formula is applicable. 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