A survey of a sample population gathers information from a few people and then the results are used to reflect the opinions of a larger population.  The reason that researchers and pollsters use sample population is that it is cheaper and easier to poll a few people rather than everybody.  One key to successful surveys of sample populations is finding the appropriate size for the sample that will give accurate results without spending too much time or money.

Suppose that 900 American teens were surveyed about their favorite ski category of the 2002 Winter Olympics in Park City, Utah.  Ski jumping was the favorite for 20% of those surveyed.  This result can be used to predict how many of all 31 million American teens favor ski jumping.

How?  _____×_____=_____

To determine how accurately the results of surveying 900 American teens truly reflect the results of surveying all 31 million American teens, a **margin of error** should be given.  When pollsters report the margin or error for their surveys, they are stating their confidence *mathematically* in the data they have collected.

The margin of error can be calculated by using the formula $\dfrac{1}{\sqrt{n}}$, where $n$ is the number in a sample size.

For the above sample, the margin of error would be $\dfrac{1}{\sqrt{900}} = \dfrac{1}{30} = 0.0\overline{3} \approx 3\%$.  Since the actual statistic could be larger or smaller than the true amount, the margin of error can be expressed as $\pm 3\%$.

1.  Find the margin of error for a survey of 100 American teens.

2.  Compare that margin of error to the margin of error of 900 teens.

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3. Find the margin of error for a survey of 9,000 teens.

4. Find the margin of error for a survey of 90,000 teens.

5. Draw a conclusion about the margin of error based on the size of the sample.

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