

Algebra 2 Honors

Working with Samples

Real-World Connection



In a random sample survey of 2309 students, 878 students said they already had career plans after high school.

- A. Find the sample proportion for the survey.

$$\frac{878}{2309} \approx 38\%$$

- B. Find the margin of error for the sample.

$$\pm \frac{1}{\sqrt{2309}} \approx 0.0208$$
$$\pm 2.08\%$$

- C. Use the margin of error to find an interval that is likely to contain the true population proportion.

$$(38 \pm 2.1)\% \quad \underline{\underline{35.9\% \text{ to } 40.1\%}}$$

Completely Editable

13.3

Lesson 13.3: Working With Samples

In statistics, we work with data. Data can be **categorical**, like political preferences and your favorite color, or **numerical**, like your salary or your weight. Statisticians survey a population to collect data or take a **census** when *all* individuals are surveyed.

Term	Definition
Statistic	A number that describes or summarizes a sample.
Parameter	A number that describes a population.
Sample	Gathers information from only part of a population.
Margin of Error	An estimate of error in sample proportion based on the standard deviation. The larger the sample size, the smaller the margin of error.
Sample Proportion	The ratio of the number of times an event occurs, x , to the sample size, n .
Sampling Methods	Description

B. A news anchor invites viewers to call the program and express their preferences and concerns.

C. During the airing of the news, 500 people are selected at random for the viewing area. Then each person is contacted in a phone survey.

D. The television station uses a list of viewers from a specific zip code that reflects the lowest economic income in the county and contacts residents in this area for their preferences.

EX #5: A poll reports that 45% of voters favor the governor, with a margin of error of $\pm 3\%$ in an election campaign. Estimate the number of voters in the poll.

EX #6: Estimate the sample size for a $\pm 1.75\%$ margin of error.

Real-World Connection

EX #7: In a random sample survey of 2309 students, 878 students said they already had career plans after high school.

A. Find the sample proportion for the B. Find the margin of error for the sample.

Classifying a Sample

EX #1: What type of sampling is represented in each scenario?

A. The editor of a skateboarding magazine wants to find the readers' favorite places to skateboard. The latest edition of the magazine included a survey card, and 429 readers completed the survey and returned the card.

B. The student council dance committee of 5 students is going to survey their five homeroom classes to determine whether to hire a band or a DJ for the upcoming Valentine Dance.

C. A state senator randomly selects 200 voters from each county to call regarding issues related to upcoming legislation.

D. A research group selects every 20th person on a list of registered voters in a state to call about their intentions to vote in the next election.

E. A national news anchor stands in Time Square on New Year's Eve to question

B. A restaurant owner wants to know if her customers are satisfied with the selection of entrees on the menu. She asks every fifth person who comes to the restaurant during the week.

EX #4: A math class measured the heights of students. The class took three samples, shown below. Decide which sample was most likely the greatest in size and explain why.

Sample	Standard Deviation (inches)
A	1.39
B	1.02
C	1.46

D. In the same survey, 452 students of the 878 surveyed were seniors. What is the sample proportion for the seniors?

E. What is the margin of error for the seniors?

Interpreting a Margin of Error

EX #8: Surfside High is about to hold student government elections. According to a survey of a random sample of students, 42% of the students plan to vote for Palmer and 58% plan to vote for Walker. The survey's margin of error is $\pm 6.5\%$.

A. Use the margin of error to find an interval in which the actual percent of students who plan to vote for Palmer is likely to lie.

B. Use the margin of error to find an interval in which the actual percent of students who plan to vote for Walker is likely to lie.

NOTES

Name _____ Date _____

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Working with Samples Practice

Problems 1 – 4, for each sample, find the sample proportion. Write it as a percent.

- | | |
|--|---|
| 1. 38 out of 75 senior citizens prefer generic brand medications when available. | 2. 108 students out of 632 graduates are planning to attend the University of Florida |
| 3. 683 out of 1250 drivers have no infractions on their driving record. | 4. 367 teenagers out of 500 have attended a popular music concert. |

Problems 5 – 8, identify any bias in each sampling method. When appropriate, suggest a sampling method that is more likely to produce a random sample.

- Members of the Math Honor Society are planning a year end party and want to know what kinds of pizza to buy. They ask the pizza shop what kids of pizza sell the most.
- A grocery store manager wants to know how many shoppers use coupons. The manager has an employee interview every shopper who is on the cereal aisle.

- A cable TV company wants to know how many people use the pay phone survey make calls to 1200 random subscribers from 8 am
- A city commissioner wants to know the public opinion on an issue her campaign workers call people randomly from the phone book

Problems 9 – 12, find the margin of error for the sample proportion, given each sample of size n .

- | | |
|----------------|----------------|
| 9. $n = 300$ | 10. $n = 700$ |
| 11. $n = 1400$ | 12. $n = 1000$ |

Problems 13 – 16, find the sample size that produces each margin of error.

- | | |
|---------------|-----------------|
| 13. $\pm 7\%$ | 14. $\pm 0.6\%$ |
| 15. $\pm 3\%$ | 16. $\pm 1\%$ |

Problems 17 – 19, for each sample, (a) find the sample proportion, (b) the margin of error; and (c) the interval likely to contain the true population proportion. Round to the nearest percent.

- In a survey of 120 people, 78 prefer to eat ice cream in a cone rather than in a bowl.

Practice Sets

Lesson Warm-Ups

3. Identify any bias in the sampling method below. Suggest a better sampling method that will create a random sample.

The student council wants to find how much time students spend reading every week. They ask students as they enter the media center.

Name _____ Date _____ Period _____

Lesson 13.3 Working with Samples

Warm-Up #2

1. In a random sample survey of 687 homeowners, 358 said they had a dog for a pet. Find the sample proportion for the survey.
2. In the same survey, 192 homeowners of the 687 surveyed had more than one pet. What is the sample proportion for the multiple pet owners?

3. Identify any bias in the sampling method below. Suggest a better sampling method that will create a random sample.

A politician wants to know how voters feel about an important issue. She has her campaign workers call people who have made a donation to her campaign.

Form A

13.3 Working with Samples

Form B

Name _____

Date _____ Period _____

1. If 581 out of 1060 households own three televisions, what is the sample proportion as a percent?

2. Explain any bias in the sampling method.

The air quality maintenance crew wants to estimate how many of the 300 classrooms in a school have filters that need replacing. The crew examines 5 filters chosen at random from every building on every floor of the school.

In a random sample survey, 67 people of 350 surveyed would say they never lock their car.

3. Find the sample proportion.

4. Find the margin of error.

2. Explain any bias in the sampling method.

The student government was to find out how many students have jobs. A pollster interviews random students as they head to the bus loop at the end of the day.

In a random sample survey, 422 teens of 600 teens surveyed would like to see adults in the community do more to solve drug problems.

3. Find the sample proportion.

4. Find the margin of error.

Daily Lesson Quiz

Grade: _____

Grade: _____