

Algebra 2

9-Review

Take this test as you would take a test in class. When you are finished, check your work against the answers.

9-01

A normal distribution has a mean of 150 and a standard deviation of 10. Find the probability that a randomly selected x -value from the distribution is in the given interval.

1. Less than 130
2. Between 140 and 170
3. A study found that the number of students per classroom is normally distributed with a mean of 18 students and a standard deviation of 3 students. What is the probability that a randomly selected classroom will have less than 21 students?

9-02

Does the situation describe a parameter or statistic?

4. A school surveys all the students about whether they want cookies every day for lunch.
5. In a survey of 500 farmers, 76% say they like living in the country.

Identify the population and sample.

6. A restaurant manager asks 15 of the people in their dining room whether they enjoy the music.
7. A scientist is studying monarch butterflies by catching 25 and measuring their wings.

9-03

Identify the type of sample described. Then tell if the sample is more likely to be biased or unbiased.

8. A student is surveying people in her town to find out how involved they are in their local charities. The student asks only his or her own family members.
9. A faculty committee wants to know what the students think about taking extra math classes. They have a computer to generate a list of 20 students to survey.

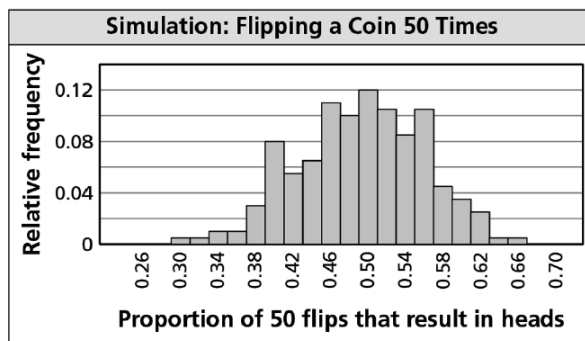
9-04

Determine whether the study is a randomized comparative experiment.

10. A recent study shows that adults who rise before 6:30 a.m. are better drivers than other adults. The study monitored the driving records of 140 drivers who always wake up before 6:30 a.m. and 140 drivers who never wake up before 6:30 a.m. The early risers had 12% fewer accidents.
11. A scientist studies the effects of a certain pollen on mice. He takes 30 mice and randomly assigns them into two groups. One group is exposed to pollen and the other groups is not.

Determine whether the following research topic is best investigated through an experiment or an observational study.

12. You want to know if weeding a flower bed every day leads to better quality flowers.
13. You want to know which yard in the neighborhood has more mosquitos.
14. You flip a coin 4 times and do not get a tails. You suspect this coin favors heads. The coin maker claims that the coin does not favor heads or tails. You use technology to simulate 200 random samples of flipping a coin 50 times. The histogram shows the results. What should you conclude when you flip the actual coin 50 times and get 25 heads?



9-05

Find the margin of error for a survey with the given sample size. Round your answers to the nearest tenth of a percent.

15. 5000

16. 100

Find the sample size required to achieve the given margin of error. Round your answers to the nearest whole number.

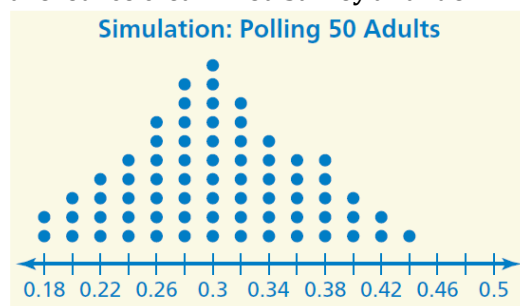
17. $\pm 2\%$ 18. $\pm 20\%$

19. In a survey of 312 people at the local shopping center, 73% favored eating food. Find the margin of error for the survey, and give an interval that is likely to contain the exact percent of all people who favor eating food.

A national polling company claims that 30% of U.S. adults like guacamole flavored ice cream. You survey a random sample of 50 adults. Use the results of the simulation.

20. What can you conclude about the accuracy of the claim that the population proportion is 0.30 when 21 adults in your survey like guacamole flavored ice cream?

21. What can you conclude about the accuracy of the claim that the population proportion is 0.30 when 15 adults in your survey like guacamole flavored ice cream?

**9-06**

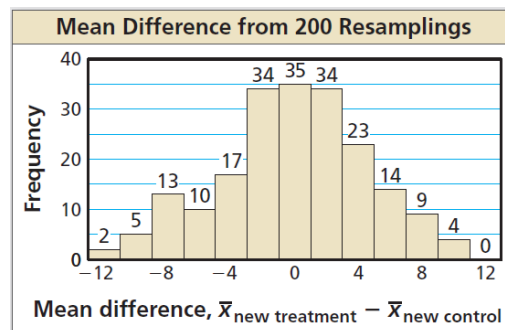
A randomized comparative experiment tests whether a supplement affects resting heart rate.

	Heart Rate (beats per minute)									
Control Group	88	72	72	63	66	74	81	76	71	74
Treatment Group	74	81	83	81	84	76	90	82	81	83

22. Find the experimental difference of the mean yield of the treatment group, $\bar{x}_{treatment}$, and the mean yield of the control group, $\bar{x}_{control}$.

A randomized comparative experiment tests whether a premium oil affects the lifespan of a particular engine. The control group involved six engines maintained using generic oil and the treatment group involved six engines maintained using premium oil. Analyze the hypothesis below. The histogram shows the results from 200 resamplings of the data.

The premium oil has no effect on lifespan.



23. Compare the experimental difference, $\bar{x}_{treatment} - \bar{x}_{control} = 9$ months, with the resampling differences. What can you conclude about the hypothesis? Does the premium oil increase the lifespan of the engine?

Answers

- | | | |
|--|--|---|
| 1. 2.5% | 10. Not a randomized comparative experiment because it is not random. There may be other reasons such as maybe the early risers go to bed earlier and get more sleep than the late risers. | 19. $Error = \pm 5.7\%$, 67.3% to 78.7% |
| 2. 81.5% | 11. Yes | 20. Not accurate |
| 3. 84% | 12. Experiment | 21. Accurate |
| 4. Parameter | 13. Observation | 22. 7.8 beats per minute |
| 5. Statistic | 14. Does not favor head or tails | 23. 9 is at the tail of the histogram. Thus, premium oil has an effect on the engine. |
| 6. Population: all the people in the dining room; Sample: the 15 people surveyed | 15. $\pm 1.4\%$ | |
| 7. Population: all monarch butterflies; Sample: the 25 that were caught and measured | 16. $\pm 10\%$ | |
| 8. Convenience; biased | 17. 2500 | |
| 9. Random; unbiased | 18. 25 | |