

Math 107
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Ch. 13 Group Project

Names: KEY

Show any work required to answer each question. As much as is possible, do your work on this sheet.

10 1. A certain drug company wishes to check on the efficiency of a blood pressure medication it manufactures. 500 patients of a group health cooperative who were taking the medication were surveyed. Of these 100 were between 30 and 40 years old, 150 were between 40 and 50 years old, 150 were between 50 and 60 years old and 100 were over 60 years old. Of these 500 patients 45% showed a significant reduction in blood pressure, 38% showed some reduction in blood pressure and 17% showed little or no change.

a) What is the population for this survey?

people taking the med. (people w/ high blood pressure)

b) What is the sample for this survey?

500 patients

c) 45% of this sample showed a significant reduction in blood pressure, what is the name we give 45%?

a statistic

d) What sort of bias(es) might have influenced this survey? (Identify and describe each.)

sampling bias - all of the sample were from the coop.
placebo effect - we don't know if it was the med.
on the idea of the med that helped.

e) What is the name of the sampling method used for this survey?

quota sampling

10 2. In order to determine how American college students feel about a proposed national law (hypothetical) that would raise the minimum drinking age to 22 years, a survey was conducted. 500 undergraduate students from the University of Washington were interviewed by four interviewers each of whom interviewed 20 freshmen, 25 sophomores, 40 juniors and 40 seniors. Of the 500 undergraduates interviewed, 25% favored the proposed law, 65% opposed it, while 10% had no opinion.

a) What is the population for this survey?

American college students

b) What is the sample for this survey?

UW students (500).

c) If you wanted to choose a more representative sample group of the same size, explain how you would choose the participants.

- o sample from many colleges (5 types of higher ed)
- o account for age.
- o account for race.
- o drink - do not drink.

3. In order to determine the effects of a new pill designed to curb the appetite, a researcher conducts the following experiment: 500 volunteer subjects (280 overweight men and women and 220 normal weight men and women) to participate in the study. The researcher gives the overweight men and women the real pill and the men and women of normal weight a sugar pill (placebo).

I.) Which of the following statements are most likely to be true and which false.

- a) the experiment is a clinical study. True or False
- b) the experiment is a controlled placebo experiment. True or False
- c) the control group consists of 500 people. True or False
- d) the experiment is a double blind experiment. True or False
- e) the experiment is a blind experiment, but not a double blind experiment. True or False
- f) the experiment is not a blind experiment. True or False
- g) the experiment is a double blind experiment, but not a blind experiment. True or False

II.) Why are the results of the experiment likely to be invalid? Give a detailed reason.

the groups are not random - there is
extreme selection bias.

4. A certain voting district has 420 Republicans, 510 Democrats and 70 independents. A scientist wants to have some idea of how many Republicans are in the district without actually counting them all. To do this, she randomly selects 150 voters from the district. Of the 150 voters, 46% are Republican. Based on this information, the scientist concludes that there are approximately 460 Republicans in the district.

a) What is the population for this survey? (Give the N-value.)

$N = 1000$ - voters in a district.

b) What is the sample for this survey?

150 voters

c) What is the sampling rate for this survey?

15%

d) What is the sampling error for this survey?

$$\frac{460 - 420}{420} = \frac{40}{420} = \frac{2}{21} \approx 9.5\%$$

e) What kind of sampling method was used?

Random sampling.

5. A container has 400 red marbles and 1600 white marbles. A scientist wants to have some idea of how many red marbles are in the container without actually counting them all. To do this, she randomly draws 150 marbles from the container. Of the 150 marbles, 22% are red. Based on this information, the scientist concludes that there are approximately 440 red marbles in the container.

- a) What is the population for this survey? N-value?

$N = 2000$ — marbles in a container.

- b) What is the sample for this survey?

150 marbles

- c) What is the sampling rate for this survey?

7.50%

- d) What is the sampling error for this survey?

$$\frac{440 - 400}{400} = \frac{40}{400} = 10\% \text{ error}$$

6. An advertisement similar to the following for a clinical study appeared in your local newspaper.

Do you have congestive heart failure? ABC Studies is looking for men and women (age 18 – 75) for participation in a clinical research trial. It will evaluate the effects of a medication currently approved for another ailment on congestive heart failure. If chosen for the study you receive free exam, free EKG, free Blood tests, free chest X-rays and up to \$500.

- a) Identify the variable being tested.

effect of med on congestive heart failure.

- b) Identify the control group.

people who get a placebo.

- c) Identify the treatment group.

people who get the med.

7. To estimate the population in a rookery, 4965 fur seal pups were captured and tagged in early August. In late August, 900 fur seal pups were captured. Of these 218 had been tagged. Based on these figures, estimate the population of fur seal pups in the rookery to the nearest hundred.

$$\frac{218}{900} = \frac{4965}{N} \Rightarrow N = \frac{4965 \cdot 900}{218}$$

$\approx 20,500$ seal pups.