

**Question 1****5 pts**

Identify the level of measurement corresponding to the data "Cost of rod and reel" associated with fishing.

- interval
- none of these choices
- ratio
- nominal
- ordinal

**Question 2****5 pts**

Identify the sampling technique used in the following information.

An important part of employee compensation is a benefits package that might include health insurance, life insurance, child care, vacation days, retirement plan, parental leave, bonuses, etc. Suppose you want to conduct a survey of benefits packages available in private businesses in Hawaii. You want a sample size of 100. Sampling technique used to get the sample size of 100 is described below.

Group the businesses according to type: medical, shipping, retail, manufacturing, financial, construction, restaurant, hotel, tourism, other. Then select a random sample of 10 businesses from each sample type.

- Systematic sample
- Convenience sample
- Stratified sample
- Cluster sample
- Simple random sample

**Question 3****5 pts**

Find the technique for gathering data in the study below.

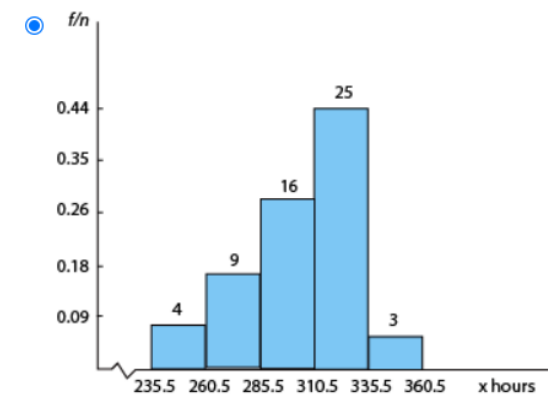
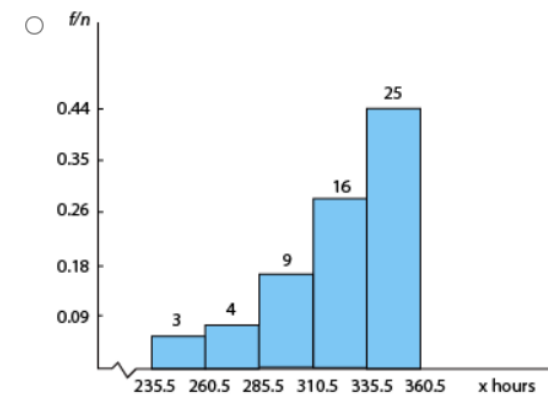
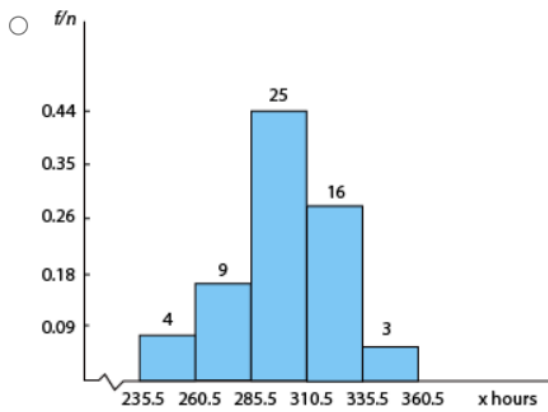
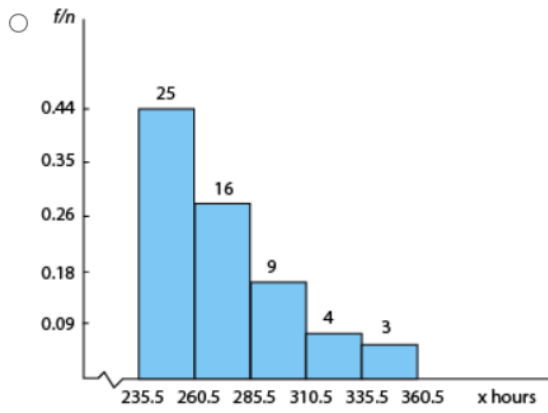
An analysis of a sample of 31,000 patients from New York hospitals suggests that the poor and the elderly sue for malpractice at one-fifth the rate of wealthier patients (Journal of the Medical Association).

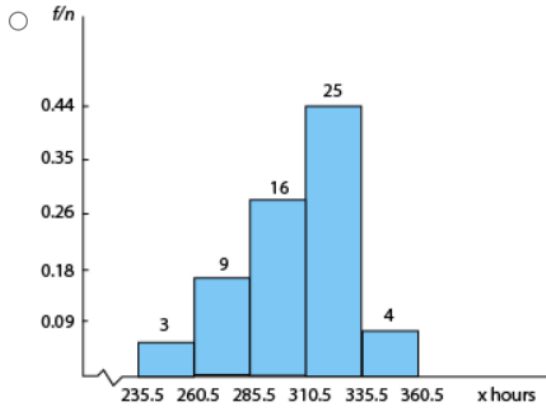
- census
- sampling
- simulation
- experiment
- none of these choices

**Question 4****5 pts**

Finish times (to the nearest hour) for 57 dogsled teams are shown below. Draw a relative-frequency histogram. Use five classes.

261 270 236 244 280 296 284 298 289 289 248 256  
338 360 341 333 261 267 287 296 313 311 309 309  
299 303 277 283 304 305 288 290 288 289 297 299  
332 330 309 328 309 328 285 291 295 298 306 315  
310 318 318 320 333 321 323 324 327



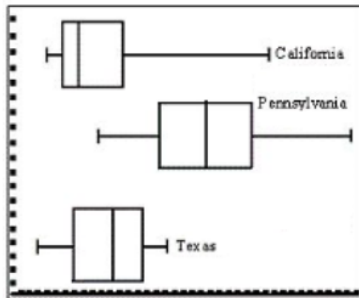


### Question 5

5 pts

Suppose automobile insurance companies gave annual premiums for top-rated companies in several states. The figure below shows box plots for the annual premium for urban customers in three states.

Insurance Premium (annual, urban)



Which state has the smallest interquartile range?

- Texas has the smallest interquartile range.
- Pennsylvania has the smallest interquartile range.
- Pennsylvania as well as California have the smallest interquartile range.
- California has the smallest interquartile range.
- None of these choices.



### Question 6

5 pts

Suppose the age distribution of the Canadian population and the age distribution of a random sample of 559 residents in the Indian community of Red Lake are shown below.

Age (years)	Percentage of Canadian Population	Observed Number in Red Lake Village
Under 5	7.9%	52
5 to 14	12.6%	68
15 to 64	67.0%	390
65 and older	12.5%	49

Suppose that we use to test the claim that the age distribution of the general Canadian population fits the age distribution of the residents of Red Lake Village. Verify that the value of  $\chi^2$  is 8.351, and find (or estimate) the  $P$ -value of the sample test statistic.

$0.9 < P\text{-value} < 0.95$

$0.95 < P\text{-value} < 0.975$

$P\text{-value} < 0.005$

$0.025 < P\text{-value} < 0.05$

$0.005 < P\text{-value} < 0.01$



### Question 7

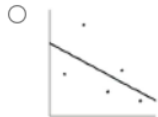
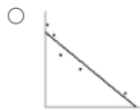
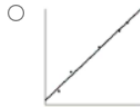
5 pts

In baseball, is there a linear correlation between batting average and home run percentage? Let  $x$  represent the batting average of a professional baseball player. Let  $y$  represent the home run percentage (number of home runs per 100 times at bat). Suppose a random sample of baseball players gave the following information.

$x$  0.251 0.259 0.29 0.265 0.269

$y$  1.3 3.7 5.8 3.9 3.7

Choose the correct scatter diagram with the line that best fits the data.



**Question 8****5 pts**

The heights of 18-year-old men are approximately normally distributed with mean 68 inches and standard deviation 3 inches. What is the probability that an 18-year-old man selected at random is greater than 65 inches tall? Round your answer to four decimal places.

- 0.1587
- 0.8413
- 0.3413
- 0.6826
- 1.6826

**Question 9****5 pts**

A professional employee in a large corporation receives an average of 41.0 emails per day. Most of these e-mails are from other employees in the company. Because of the large number of e-mails, employees find themselves distracted and are unable to concentrate when they return to their tasks. In an effort to reduce distraction caused by such interruptions, one company established a priority list that all employees were to use before sending an e-mail. One month after the new priority list was put into place, a random sample of 40 employees showed they were receiving an average of 33.3 e-mails per day. The computer server through which the e-mails are routed showed that  $\sigma=15.2$ . Use a 5% level of significance to test the claim that there has been a change (either way) in the average number of e-mails received per day per employee. What are the null and alternate hypotheses?

- $H_0 : \mu \neq 41.0$  e-mails;  $H_1 : \mu = 41.0$  e-mails
- $H_0 : \mu = 41.0$  e-mails;  $H_1 : \mu \neq 41.0$  e-mails
- $H_0 : \mu = 41.0$  e-mails;  $H_1 : \mu < 41.0$  e-mails
- $H_0 : \mu = 41.0$  e-mails;  $H_1 : \mu > 41.0$  e-mails
- $H_0 : \mu \neq 41.0$  e-mails;  $H_1 : \mu > 41.0$  e-mails

**Question 10**

5 pts

In a random sample of 72 professional actors, it was found that 59 were extroverts. Let  $p$  represent the proportion of all actors who are extroverts. Find a point estimate for  $p$ . Round your answer to three decimal places.

- 1.220
- 0.819
- 0.410
- 0.590
- 59.000

**Question 11**

5 pts

Finish times (to the nearest hour) for 10 dogsled teams are shown below.

Make a frequency table showing class limits, class boundaries, midpoints, frequency, relative frequencies, and cumulative frequencies. Use three classes. The class size of the given data is 24. (Round your answer for relative frequency to the nearest hundredth and for midpoint to the nearest tenth.)

262   236   272   256   294   242   288   258   284   310

### How to create a table

1. Click on the table icon above, located on the second row of icons, first from the left.
2. Hover over the word **Table** and scroll, then click over the amount of rows and columns. A blank table will be created.

[Additional Help](#)

Edit View Insert Format Tools Table

12pt Paragraph | **B** *I* U **A**   $\text{T}^2$  | :



### Question 12

5 pts

Are customers more loyal in the East or in the West? The following table is based on information from Trends in the United States, published by the food marketing Institute, Washington, D.C. The columns represent loyalty (in years) at a primary supermarket. The rows represent regions of the United States.

	Less Than 1 Year	1 - 2 Years	3 - 4 Years	5 - 9 Years	10 - 14 Years	15 or More Years	Row Total
East	32	54	59	112	77	118	452
Midwest	31	68	68	120	63	173	523
South	53	92	93	158	106	158	660
West	41	56	67	78	45	86	373
Column Total	157	270	287	468	291	535	2008

- a) What is the probability that a customer chosen at random has been loyal 1 or more years given that he or she is from the Midwest? Round your answer to the nearest thousandth.
- b) What is the probability that a customer chosen at random is from the East given that he or she has been loyal from 10 to 14 years? Round your answer to the nearest thousandth.
- c) What is the probability that a customer chosen at random has been loyal from 3 to 4 years? Round your answer to the nearest thousandth.

Edit View Insert Format Tools Table

12pt Paragraph | **B** *I* U A   $T^2$  | :

### Question 13

5 pts

Richard has been given a 9-question multiple-choice quiz in his history class. Each question has three answers, of which only one is correct. Since Richard has not attended the class recently, he doesn't know any of the answers.

- Assuming that Richard guesses on all 9 questions, what is the value of  $p$ ? ( $p$  is the value of success) Round your answer to the nearest tenth.
- What is the probability that he gets 5 questions right out of 9 questions? Round your answer to the nearest thousandth.
- What is the probability that he gets none of the questions right? Round your answer to the nearest thousandth.

**Question 14****5 pts**

Suppose thirty-four communities have an average of 141.6 reported cases of larceny per year. Assume that  $\sigma$  is known to be 36.4 cases per year. Find a 75%, 80%, and 95% confidence interval for the population mean annual number of reported larceny cases in such communities.

- Compute the margins of error for each confidence intervals. Round your answers to one decimal place.
- As the confidence level increase, do the margins of error increase?

**Question 15****5 pts**

Suppose a certain species bird has an average weight of 3.5 grams. We can assume that the weights of these birds have a normal distribution with  $\sigma = .27$  grams. Find the sample size necessary for a 75% confidence level with a maximal error of estimate  $E = .08$  for the mean weights of the birds. Round your answer to the next higher whole number.

**Question 16****5 pts**

Suppose a random sample of 459 married couples found that 307 had two or more personality preferences in common. In another random sample of 471 married couples, it was found that only 31 had no preferences in common. Let  $p_1$  be the population proportion of all married couples who have two or more personality preferences in common. Let  $p_2$  be the population proportion of all married couples who have no personality preferences in common. Find a 95% confidence interval for  $p_1 - p_2$ . Round your answer to three decimal places.

**Question 17****5 pts**

Suppose that the mean time for a certain car to go from 0 to 60 miles per hour was 7.6 seconds. Suppose that you want to set up a statistical test to challenge the claim of 7.6 seconds as the value obtained from the 50 cars for a sample was 7.8. The standard deviation of the sample was 0.2. Use the significance level  $\alpha = .01$ .



- State the Null and Alternate Hypothesis.
- Which test should be conducted in this scenario?
- Compute the numerical value of the test statistics.
- Find the p-value corresponding the test statistics.
- Is the test statistically significant? Will you reject or fail to reject the null hypothesis?
- Find the 95% Confidence Interval for the population.

**Question 18****5 pts**

Are America's top chief executive officers (CEOs) really worth all that money? One way to answer this question is to look at row *B*, the annual company percentage increase in revenue, versus row *A*, the CEO's annual percentage salary increase in that same company. Suppose that a random sample of companies yielded the following data:

B: Percent increase for company	12	14	16	24	15	10	10	9
A: Percent increase for CEO	2	10	15	20	10	14	3	0

Do these data indicate that the population mean percentage increase in corporate revenue (row *B*) is different from the population mean percentage increase in CEO salary? Assume that the distribution of differences is approximately normal, mound-shaped and symmetric. Use a 1% level of significance. Use paired t tests

- State the Null and Alternate Hypothesis.
- Compute the numerical value of the test statistics.
- Find the p-value corresponding the test statistics.
- Is the test statistically significant? Will you reject or fail to reject the null hypothesis?

**Question 19****5 pts**

It is thought that prehistoric Indians did not take their best tools, pottery, and household items when they visited higher elevations for their summer camps. It is hypothesized that archaeological sites tend to lose their cultural identity and specific cultural affiliation as the elevation of the site increases. Let  $x$  be the elevation (in thousands of feet) for an archaeological site in the southwestern United States. Let  $y$  be the percentage of unidentified artifacts (no specific cultural affiliation) at a given elevation. Suppose that the following data were obtained for a collection of archaeological sites in New Mexico:

$x$    5.00   5.25   5.75   6.75   7.00

$y$    8   15   13   49   71

- Find the equation of the least squares line . Round  $a$  and  $b$  to three decimal places.
- Find the correlation coefficient  $r$  for the elevation and percentage of unidentified artifacts (no specific cultural affiliation) at a given elevation

**Question 20**

5 pts

The following table shows the Myers-Briggs personality preferences for a random sample of 400 people in the listed professions.

Occupation	Extroverted	Introverted	Row Total
Clergy (all denominations)	65	42	107
M.D.	65	92	157
Lawyer	52	84	136
Column Total	182	218	400

Suppose that we use the chi-square test to determine if the listed occupations and personality preferences are independent at  $\alpha = .01$ .

- Create Null and Alternate Hypothesis to check if the listed occupations are independent of the personality preferences (extroverted/introverted).
- Conduct the chi-square test. Numerically compute the chi-square test statistics. Round your answer to two decimal places.
- What is the p-value range corresponding the chi-square test statistics.
- Was the test significant? Will you reject or fail to reject the null hypothesis?