

1. State whether the boldface numbers represent a statistic or parameter.

a. On Tuesday, the bottles of Arizona Iced Tea filled in a plant were supposed to contain an average of **20** ounces of iced tea. Quality control inspectors sampled 50 bottles at random from the day's production. These bottles contained an average of **19.6** ounces of iced tea.

b. On a New York to Denver flight, **8%** of the 125 passengers were selected for random security screening before boarding. According to the Transportation Security Administration, **10%** of passengers at this airport are chosen for random screening.

2. The 5-number summary contains?

3. The following table shows the distribution of AP Statistics scores in the 50 states and the District of Columbia for 2014. Identify the boundaries for outliers.

N	MEAN	MEDIAN	STDEV	MIN	MAX	Q1	Q3
51	531.90	525.00	33.76	480.00	596.00	501.00	565.00

4. The following table gives the probability distribution for the number of courses for which a randomly selected university student is registered.

x	1	2	3	4	5	6	7
p(x)	.02	.03	.09	.25		.16	.05

What must be the probability that a randomly selected student is registered in 5 courses in order for this to be a legitimate probability distribution?

5. A large number of farm plots in Tippecanoe County are checked for the presence of five different types of corn insects. From these data we find the following probability distribution for the number of these types of insects that are present in a randomly chosen field.

Number	0	1	2	3	4	5
Probability	0.05	0.23	0.36	0.25	0.10	0.01

a. In a randomly selected field, what is the probability that either none or exactly one of these types of insects are present?

b. In a randomly selected field, what is the probability that three or less of these types of insects are present?

c. In a randomly selected field, what is the probability that more than one type of insect is present?

6. $P(A) = 0.6$, $P(B) = 0.4$ and $P(A \cap B) = 0.3$, find $P(A \cup B)$.

7. In an apartment complex, 40% of residents read *USA Today*. Only 25% read the *New York Times* and 5% of residents read both papers.

a. Create a Venn Diagram to represent the above information.

b. What is the probability that a randomly selected resident read the *USA Today* or the *New York Times*?

8. Which of the following are **not** affected by outliers?

- a. interquartile range b. mean c. median d. range
e. correlation coefficient f. standard deviation g. variance

9. Name the 3 principles of experimental design.

10. Name 2 sampling methods that are almost guaranteed to introduce bias into the sample.
11. Draw a residual plot that would indicate that the line fits the data well.
12. State whether the following are categorical or quantitative variables.
- The hospital you were born at.
 - How many shoes you own.
 - Your GPA
 - Your favorite ice cream
13. A student organization wants to assess the attitudes of students towards a proposed change in the hours that the school store is open. They randomly select 100 freshman, 100 sophomores, 100 juniors and 100 seniors. This is an example of what type of sampling method?
14. A sample in which every member of the population is given a numeric label and then the sample is chosen using a random digit generator or table is called?
- probability sample
 - stratified random sample
 - simple random sample
 - convenience sample
15. Data on IQ test scores and reading test scores for a group of fifth-grade children give the following regression line: $\text{predicted reading score} = -33.4 + 0.882(\text{IQ score})$. Find the predicted reading score for a child with an IQ score of 90.
16. We say that the design of a study is biased if which of the following is true?
- racial and sexual prejudice is suspected
 - random placebos have been used
 - it systematically favors certain outcomes
 - the correlation is greater than 1 and less than -1

17. Soda companies have begun marketing 10-calorie sodas. The companies believe men prefer the taste and name of these drinks over traditional diet sodas. The table summarizes the preferences of a random sample of 50 men and 50 women.

	Diet	10-calorie	Total
Men	12	38	50
Women	41	9	50
Total	53	47	100

- What percent of the sample prefer Diet soda?
- What percent of the men prefer the 10-calorie soda?
- What percent of those who prefer Diet soda are women?

18. A survey asks a random sample of 1200 adults in New York City if they support an increase in the subway fare, with the additional revenue going to improving the city streets. Let \hat{p} denote the proportion in the sample that say they support the increase. Suppose that 40% of *all* adults in New York City support the increase.

- The mean $\mu_{\hat{p}}$ of \hat{p} is _____.
- The standard deviation $\sigma_{\hat{p}}$ of \hat{p} is _____.
- Assume all conditions are satisfied. What is the probability that less than 35% of the randomly selected adults support the increase? _____

19. Leah is flying from Boston to Denver with a connection in Chicago. The probability that her first flight leaves on time is 0.15. If the flight is on time, the probability that her luggage will make the connecting flight in Chicago is 0.95, but the first flight is delayed, the probability that the luggage will make it is only 0.65. What is the probability that Leah's luggage arrives in Denver with her? (Hint: think tree diagram)

20. Scores on the college board SAT critical reading exam are normally distributed with mean 500 and standard deviation 100. What percent of scores are above 700?

21. In a statistics course, a linear regression equation was computed to predict the exam score of a student given his/hers anxiety score prior to the exam. The equation was $\hat{y} = 71.3 + 1.14x$ where y is the exam score and x is the anxiety score prior to the test. Carla scored 23 on the anxiety score and had a 95 on the exam. What is the residual for this point?

22. Name 4 good sampling methods.

23. The yield of irrigated corn under standard conditions in plots on a Nebraska experimental farm is normally distributed with $\mu = 120$ and $\sigma = 6$ bushels per acre. If the researcher plants 9 plots, what is: (Hint: think sampling distribution of a sample mean)

a. The mean $\mu_{\bar{x}}$ of \bar{x} is _____.

b. The standard deviation $\sigma_{\bar{x}}$ of \bar{x} is _____.

c. Assume all conditions are satisfied. What is the probability that the mean yield, \bar{x} , is greater than 125 bushels per acre?

24. About 22% of the residents of California were born outside the U.S. You choose a simple random sample of 1,000 California residents for a survey sample on immigration issues. You want to find the probability that 25% or more of the people in your sample were born outside the U.S.
(Hint: Think sampling distribution of a sample proportion) (Assume all conditions are met)

25. The scores on a statistics test are normally distributed with a mean of 83 and a standard deviation of 11. If the top 20% of students are given A's, what is the lowest mark that a student can have and still be awarded an A?

26. In an experiment on the effect of a drug on reaction time, a subject is asked to depress a button whenever a light flashes. Her reaction times for 11 trials are (in milliseconds)

93, 93, 95, 96, 99, 100, 100, 101, 107, 112, 138

a. Find the 5 number summary

b. Find the IQR. Are there any outliers? Justify

27. The following data is the sugar and calories for popular candies.

Sugar (g)	Calories	Sugar (g)	Calories
45	450	61	580
107	570	87	450
62	480	92	490
44	370	136	680
79	590	59	460
60	420	48	350

- Create a scatterplot using sugar as the explanatory variable. Show a sketch.
- Find the equation of the least-squares regression line.
- Find the value of the correlation coefficient (r). What does it tell you about the scatterplot?
- Find the residual for the point when the sugar content was 107 grams.