

Key

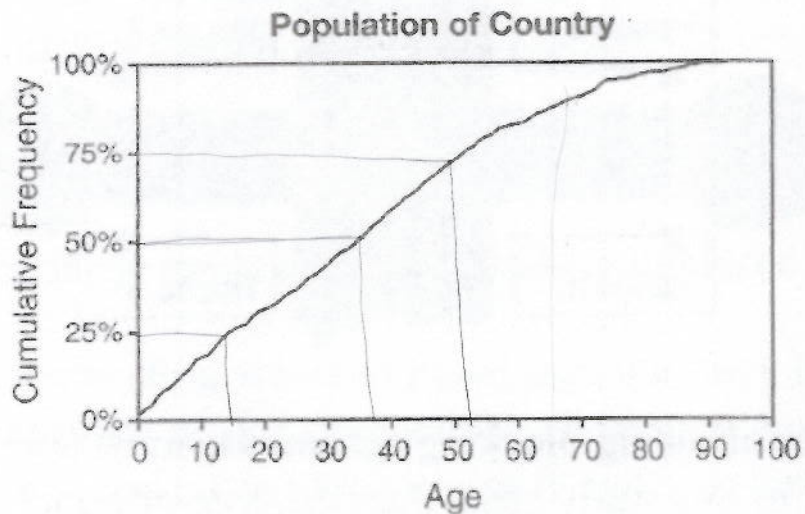
Chapter 1 Test Review

Multiple Choice Questions

1. A baseball coach wants to compare the number of hits by two groups of batters each using a different type of bat. Which type of graphical display would NOT be appropriate?

- A) Parallel boxplots
- B) Dotplots drawn on the same scale
- C) Back-to-back stemplots
- D) Histogram drawn on the same scale
- E) Scatterplot

2. The distribution of the population by age in a particular country is represented by the given cumulative relative frequency plot.



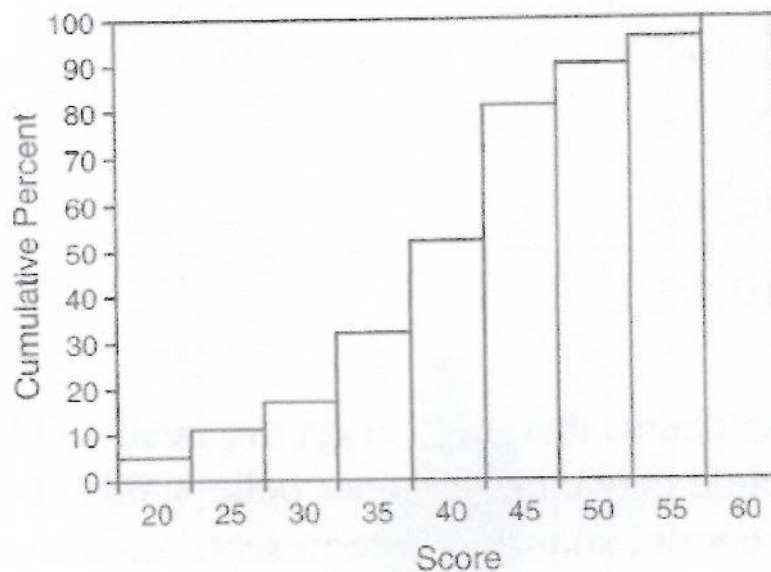
Which of the following statements about the population is true?

- A) The median age is 46 years.
- B) The interquartile range of ages is about 27 years old.
- C) The mean age is greater than the median age.
- D) There are more people older than 65 years of age than those younger than 30 years of age.
- E) Seventy-five percent of people are older than 50 years of age.

3. There is presently a dispute about allocation of federal funds to schools in two regions of a large school district. The director of federal funds, whose spouse works in the West region, has been accused of providing more money to school in the West region than the East region. Two sets of data are gathered by the school board: one listing the amount of money allocated per pupil in the 26 West region schools, the other listing the same for the 26 East region schools. The school board wants to make a graph showing a comparison of the spending between the regions. Which of the following graphs is *inappropriate* to make such a comparison?

- A) Scatterplot
- B) Parallel boxplots
- C) Back-to-back stemplots
- D) Parallel dotplots using the same scale
- E) Parallel histograms using the same scale

4. The display below shows the cumulative relative frequency histogram of scores from the 20-question math placement exam taken by 40 freshman upon entering a high school.



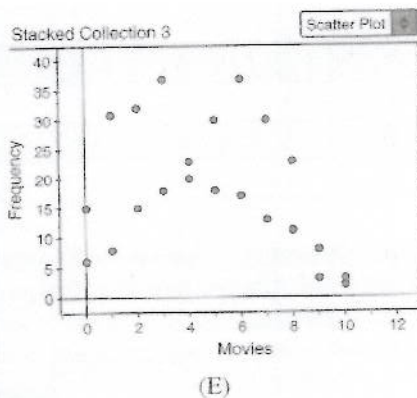
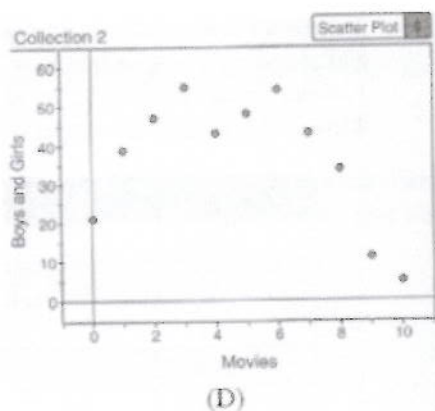
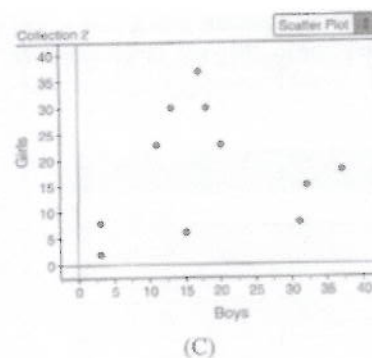
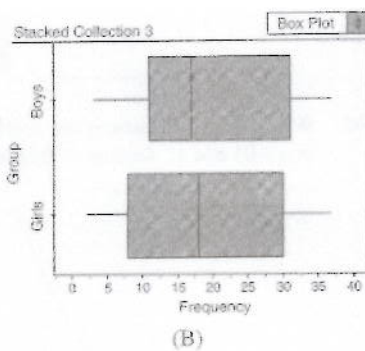
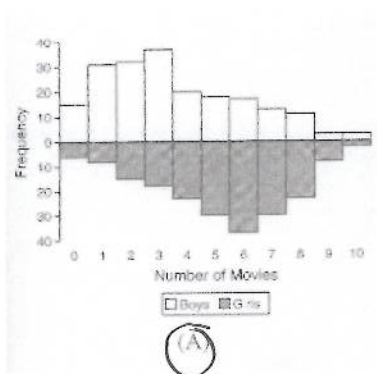
Which of the following is a correct statement based on the information in the display?

- A) The median score is 30.
- B) Most students scored above 50.
- C) No one scored 35 on this test.
- D) About four times as many students ^{scored} 30 than 20.
- E) There were about equal numbers of students with scores between 50 and 60.

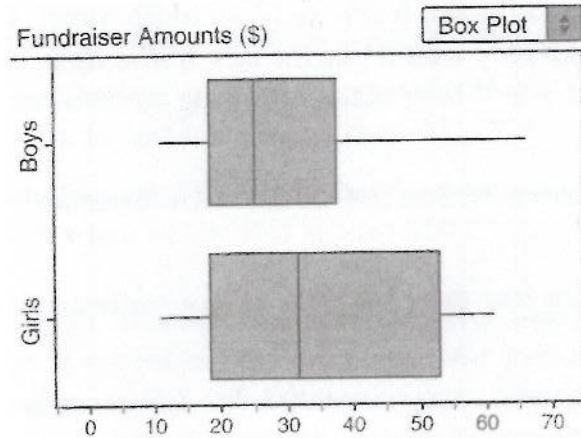
5. A statistics class randomly surveyed 200 boys and 200 girls at their school and asked each respondent how many movies they saw in theaters over summer break. The results are shown in the frequency table below.

Number of Movies	Frequency of Boys	Frequency of Girls
0	15	6
1	31	8
2	32	15
3	37	18
4	20	23
5	18	30
6	17	37
7	13	30
8	11	23
9	3	8
10	3	2

Which of the following graphs is appropriate to compare the number of movies seen by boys and girls over summer break?



6. The parallel boxplots below represent the amount of money collected (in dollars) in a 1-day fundraiser from each of 16 boys and 16 girls in a certain neighborhood in town. Which of the following is known to be true about the data by looking at the plots?



- A) The boys collected more money than the girls.
 B) The median of the amounts the girls collected is larger than the median of the amounts the boys collected.
 C) The distribution of the amounts the boys collected is fairly symmetric.
 D) The interquartile range of both distributions is the same.
 E) There is less variability in the amounts the girls collected than the boys.
7. A study was done to explore a link between a particular medication prescribed to pregnant woman and the incidence of a certain medical condition in newborns. Records of 952 recent newborns and their mothers were examined. The following table shows the results of the study.

		Mother took medication?		
		Yes	No	Total
Newborn has condition?	Yes	21 $\frac{1}{3}$	245 $\frac{92}{100}$	266
	No	57 $\frac{3}{5}$	629 $\frac{10}{100}$	686
	Total	78	874	952

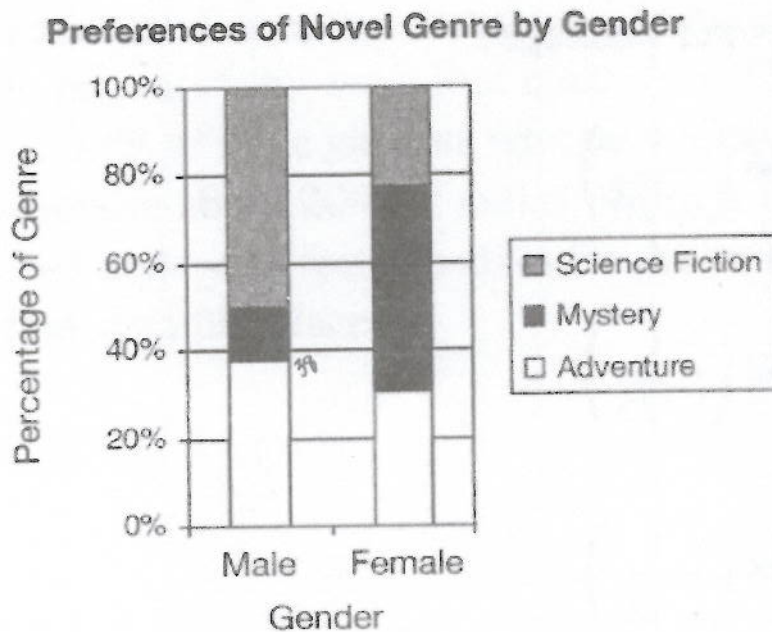
Which of the following best describes the association between mothers-to-be taking the medication and the presence of the condition in newborns?

- A) There appears to be no association since the condition was present in newborns of mothers that either took or did not take the medication.
 B) There appears to be no association since the condition was present in about the same proportion of newborns of mothers that either took or did not take the medication.
 C) There appears to be no association because more newborns of mothers who did not take the medication had the condition than newborns of mother who did take the medication.
 D) There appears to be no association because more newborns did not have the condition than those who did.
 E) There appears to be an association because the condition was present in newborns of mothers who took the drug.

8. The salaries for an electronics company were posted in their annual sales report for all stockholders. The president of the company makes the most money. His salary was mistakenly shown to be \$25,000 less than it actually is. Even with the mistake, his salary is still higher than anyone else's. Which statistic did not change after the mistake was corrected?

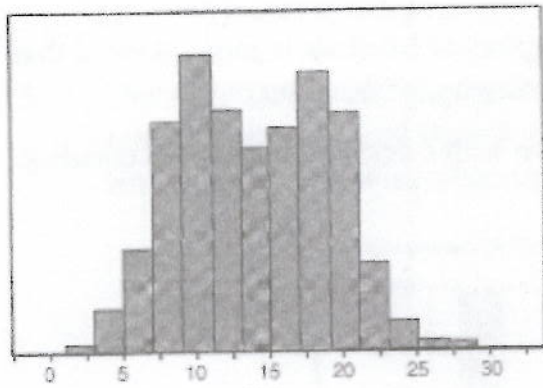
- A) Standard deviation
- B) Mean
- C) Median
- D) Variance
- E) Range

9. The segmented bar graphs shown below summarize a survey of high school students about their favorite genre of novel. Based on the graphs, which of the following cannot be justified?

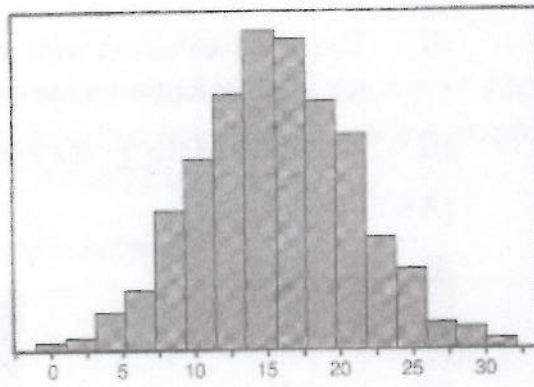


- A) For every male surveyed that preferred a mystery, about four males preferred adventure.
- B) A greater proportion of males surveyed preferred adventure than females.
- C) Females surveyed prefer mystery to either adventure or science fiction.
- D) About half of males surveyed prefer science fiction.
- E) Approximately twice as many males as females surveyed prefer science fiction.

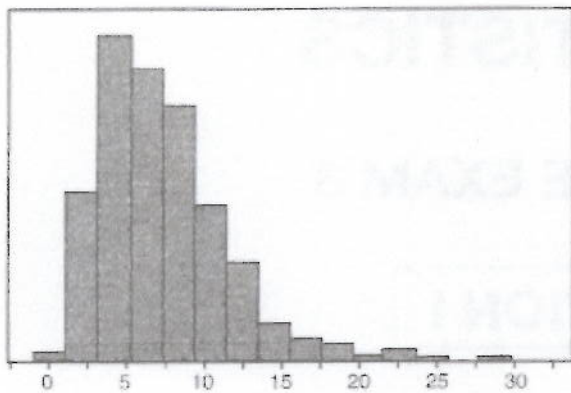
10. In which of the following distributions is the value (mean - median) likely to be the greatest?



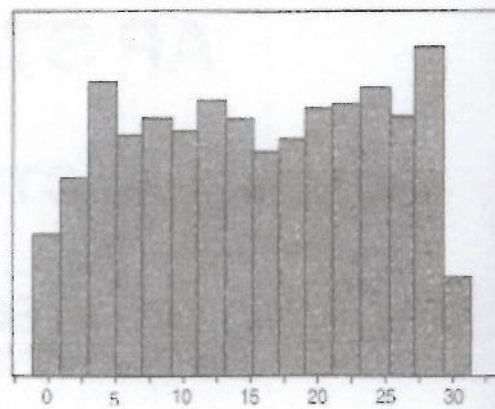
(A)



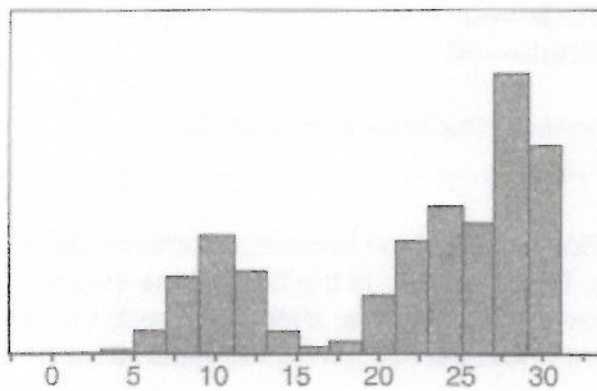
(B)



(C)

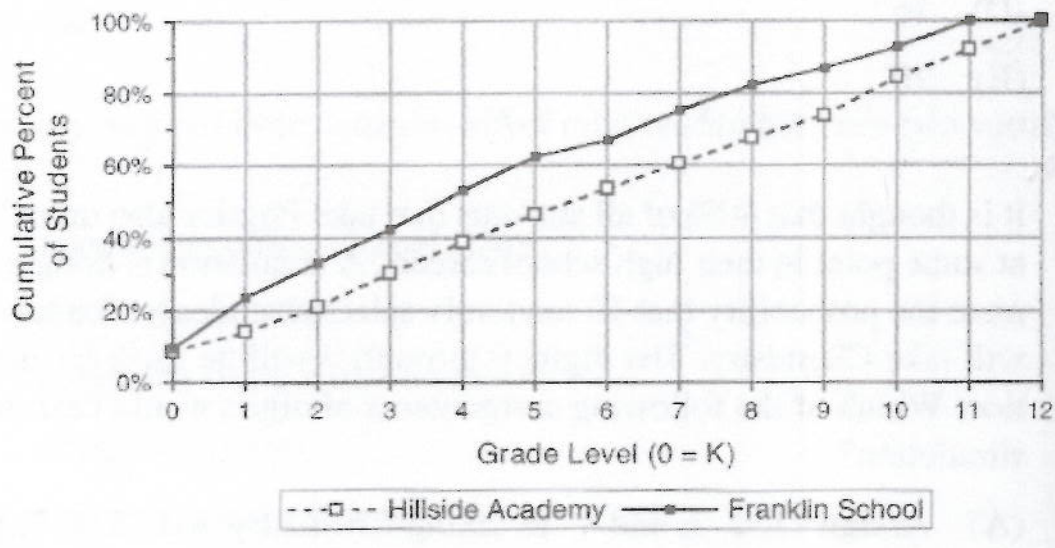


(D)



(E)

11. The populations of two large private schools were studied, Hillside Academy and Franklin School. The graph shows the cumulative percentage of students in the two schools, both of which offer grades kindergarten through 12th grade. (On the graph, kindergarten is noted as grade 0).



Which of the following statements is a correct conclusion based on the graph?

- A) More students attend Franklin School than Hillside Academy.
- B) Franklin School has more 12th grade students than kindergarten students.
- C) About half of the combined school population is at second grade and below.
- D) Franklin School students are on average in earlier grades than students at Hillside Academy.
- E) The number of students at Hillside Academy varies greatly from grade to grade.

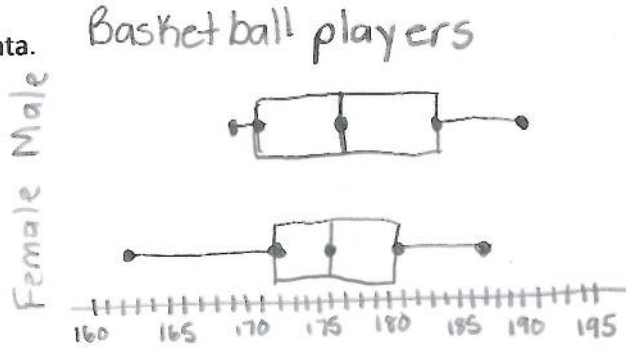
Free Response Questions

1. Male and female heights (in cm) are given for two high school basketball teams.

Male	169	170	170	173	174	175	178	180	183	185	185	191	185
Female	163	168	172	173	175	175	178	180	180	183	187	188	

- A) Construct parallel boxplot of the data.

<u>Male</u>	<u>Female</u>
Min 169	163
Q1 171.5	172.5
Med 178	176.5
Q3 185	181.5
Max 191	188



- B) Construct back-to-back stem-and-leaf plots if the data.

Males		Females
9	16	38
584300	17	23558
5500	18	00378
51	19	

- C) Compare the distribution of the heights of male and female basketball players.

The median height for the male team is only slightly higher than the median height for the female team. The distribution for the heights of the males is skewed to the right, while the female's heights have a slight left skew. The range is similar for each gender although the males show more spread among the middle 50% of players than the females do.

- D) What information is more readily available to you using the boxplot that is not with the stem-and-leaf plot?

Using the boxplot, we can easily see the medians of each data set. We can also quickly compare the range and inter-quartile range for two distributions. These values would all take some time to calculate with the stemplot.

- E) What information is more readily available to you using the stem-and-leaf plot that is not with the boxplot?

The stemplot has the advantage of showing us individual data points and giving us a more complete picture of the shape of a distribution.

2. You suspect that there is a relationship between teenagers' preference in movies and their preference in pizza. You ask 110 students at your school to choose between three movies and three pizza types. Here are the results.

Movie Preference	Pizza Preference			
	Pepperoni	Meatball	Mushroom	
Men in Black	20	15	10	45
The Big Lebowski	8	16	11	35
Monsters, Inc.	15	2	13	30
				<u>110</u>

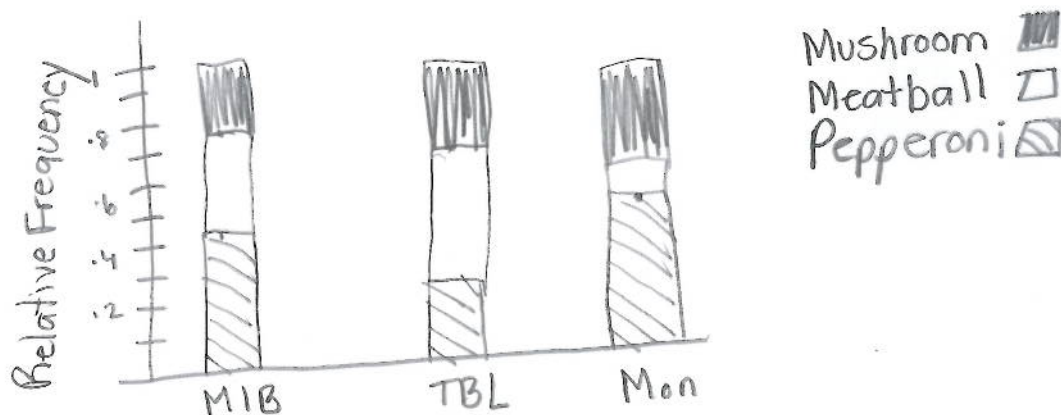
- A) Calculate the marginal distribution of movie preferences of movie preference in percents.

Men in Black : 41%.
 Big Lebowski : 32%.
 Monsters, Inc : 27%.

- B) Find the conditional distribution of pizza preference for each movie preference, in percents.

	Pepperoni	Meatball	Mushroom
MIB	44.4%	33.3%	22.2%
TBL	22.9%	45.7%	31.4%
Mon	50.0%	6.7%	43.3%

- C) Sketch a segmented bar graph for the three conditional distributions in B.



- D) Write a brief description of what the conditional distributions in B and C tell you about the relationships between these variables.

The seems to be an association between movie preference and pizza preference. Fans of Men in Black and the Big Lebowski were divided in the pizza preference, with more Men in Black fans showing preference for pepperoni and more Big Lebowski fans preferring meatball. Very few fans of Monster, Inc preferred meatball. Most were approximately divided between pepperoni and mushroom.