

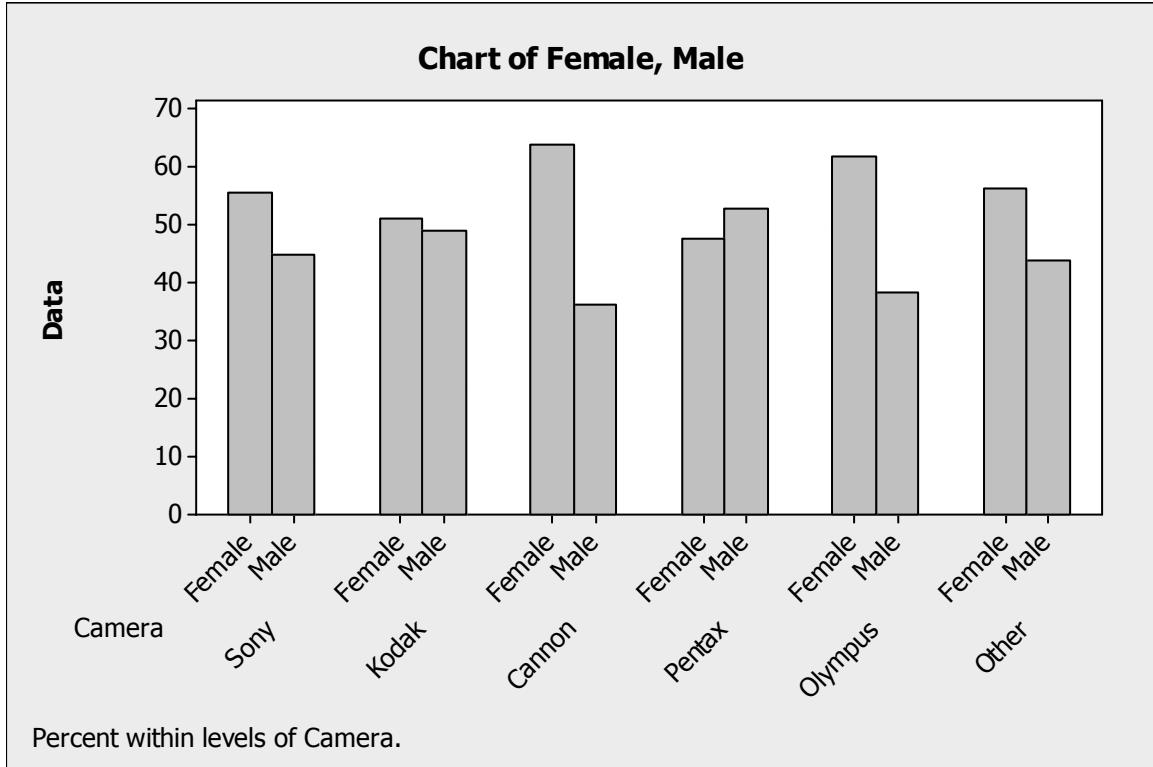
***Business Statistics: Chapter 4: Displaying and Describing Categorical Data – Quiz A***  
Name \_\_\_\_\_

A large national retailer of electronics conducted a survey to determine consumer preferences for various brands of digital cameras. The table summarizes responses by brand and gender.

	Female	Male	Total
<b>Sony Cyber-Shot</b>	73	59	<b>132</b>
<b>Kodak – Easy Share</b>	49	47	<b>96</b>
<b>Cannon Power Shot</b>	58	33	<b>91</b>
<b>Pentax</b>	37	41	<b>78</b>
<b>Olympus</b>	45	28	<b>73</b>
<b>Other Brands</b>	86	67	<b>153</b>
<b>Total</b>	<b>348</b>	<b>275</b>	<b>623</b>

1. Identify the variables and tell whether each is categorical or quantitative.
2. Find each of the following percentages.
  - a. What percent of the responses were males who prefer Pentax?
  - b. What percent of the male responses prefer Pentax?
  - c. What percent of the consumers who choose Pentax were males?
3. What is the marginal distribution of brands?
4. Prepare an appropriate chart to display the marginal distribution of brands.
5. Write a sentence or two about the conditional relative frequency distribution of the brands among female respondents.

6. Consider the following side by side bar chart for the data above:



Does the chart indicate that brand preference is independent of gender? Explain.

***Business Statistics: Chapter 4: Displaying and Describing Categorical Data – Quiz A – Key***

A large national retailer of electronics conducted a survey to determine consumer preferences for various brands of digital cameras. The table summarizes responses by brand and gender.

	Female	Male	Total
<b>Sony Cyber-Shot</b>	73	59	<b>132</b>
<b>Kodak – Easy Share</b>	49	47	<b>96</b>
<b>Cannon Power Shot</b>	58	33	<b>91</b>
<b>Pentax</b>	37	41	<b>78</b>
<b>Olympus</b>	45	28	<b>73</b>
<b>Other Brands</b>	86	67	<b>153</b>
<b>Total</b>	<b>348</b>	<b>275</b>	<b>623</b>

1. Identify the variables and tell whether each is categorical or quantitative.

Gender and Brand; both categorical.

2. Find each of the following percentages.

a. What percent of the responses were males who prefer Pentax?

6.6% (41/623)

b. What percent of the male responses prefer Pentax?

14.9% (41/275)

c. What percent of the consumers who choose Pentax were males?

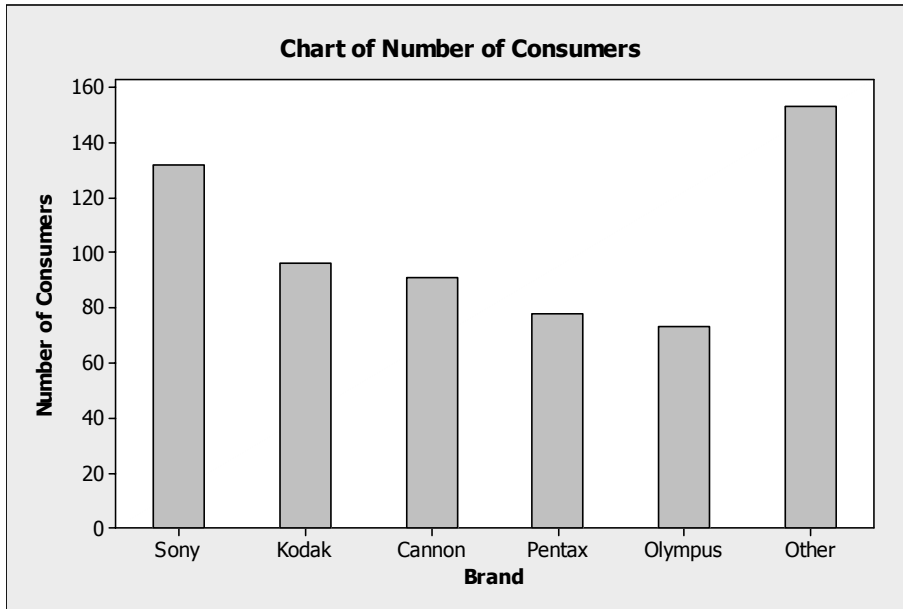
52.6% (41/78)

3. What is the marginal distribution of brands?

132 for Sony Cyber-Shot, 96 for Kodak-Easy Share, 91 for Cannon Power Shot, 78 for Pentax, 73 for Olympus and 153 for other brands.

4. Prepare an appropriate chart to display the marginal distribution of brands.

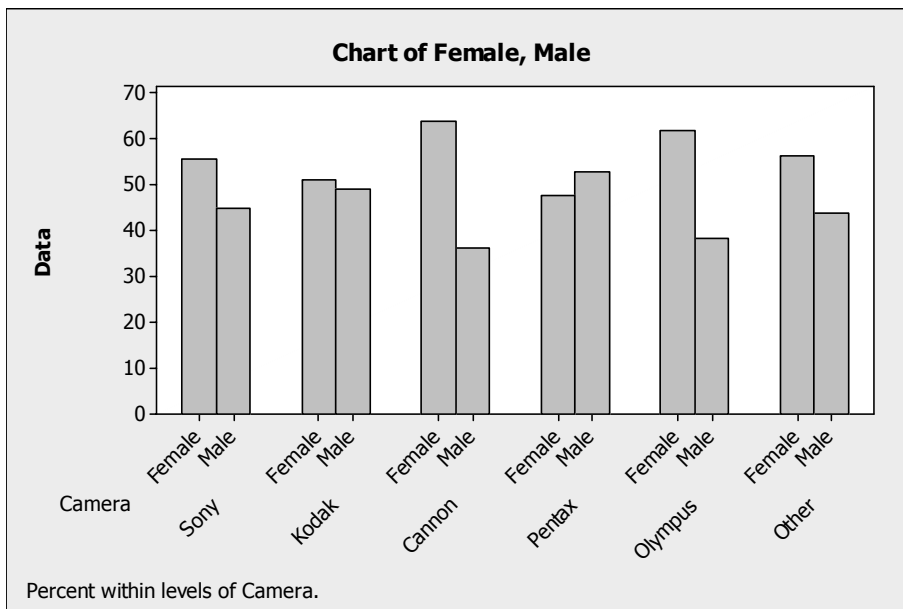
Either a bar chart (shown below) or a pie chart is appropriate.



5. Write a sentence or two about the conditional relative frequency distribution of the brands among female respondents.

Among females, 21% prefer Sony, 14.1% prefer Kodak, 16.7% prefer Cannon, 10.6% prefer Pentax, and 12.9% prefer Olympus. The remaining 24.7% of females preferred other brands.

6. Consider the following side by side bar chart for the data above:



Does the chart indicate that brand preference is independent of gender? Explain.

Brand preference does not appear to be independent of gender. Brand preferences seem to differ based on gender.

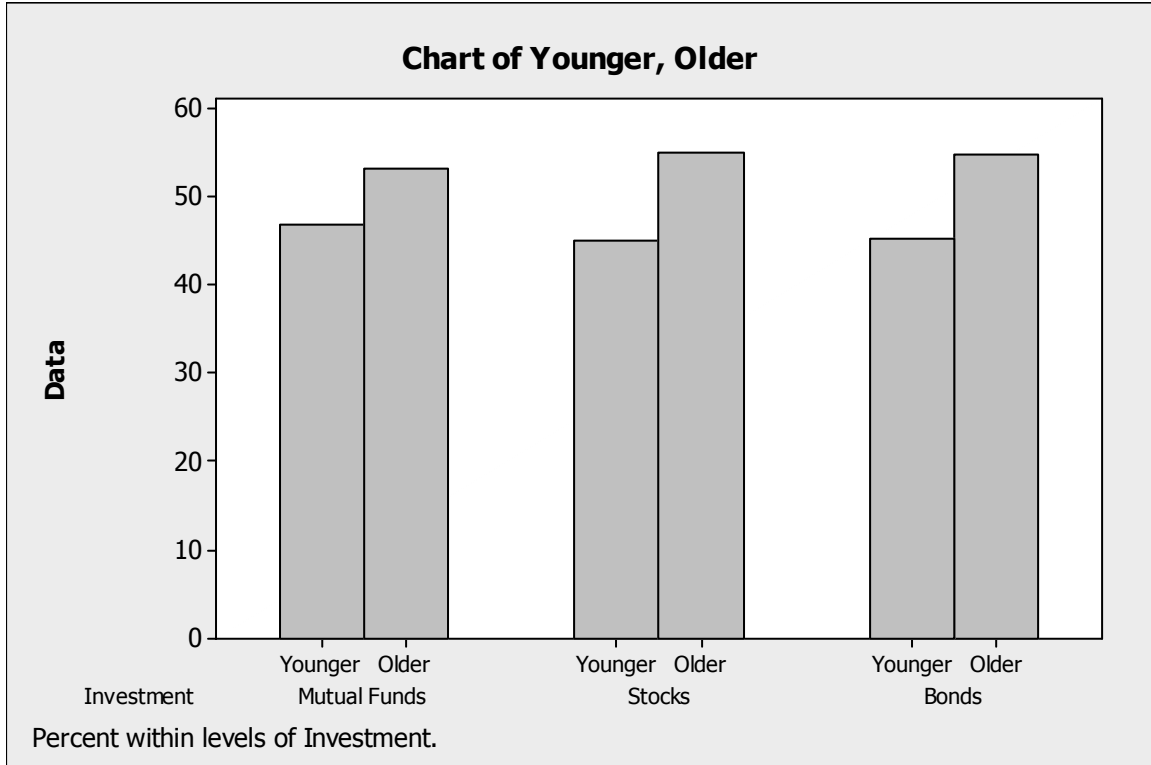
***Business Statistics: Chapter 4: Displaying and Describing Categorical Data – Quiz B***  
Name \_\_\_\_\_

A full service brokerage firm gathered information on how their clients were investing for retirement. Based on age, clients were categorized according to where the largest percentage of their retirement portfolio was invested. The table below summarized the data.

	Age 50 or Younger	Over Age 50	Total
Mutual Funds	30	34	<b>64</b>
Stocks	37	45	<b>82</b>
Bonds	19	23	<b>42</b>
Total	<b>86</b>	<b>102</b>	<b>188</b>

- Identify the variables and tell whether each is categorical or quantitative.
- Find each of the following percentages.
  - What percent of the clients are over age 50 who invests in mutual funds?
  - What percent of clients over age 50 invest in mutual funds?
  - What percent of the mutual fund investors are over age 50?
- What is the marginal distribution of age?
- Prepare an appropriate chart to display the marginal distribution of age.
- Write a sentence or two about the conditional relative frequency distribution of mode of investment for clients age 50 or younger.

6. Consider the following side by side bar chart for the data above:



Does the chart indicate that mode of investment is independent of age? Explain.

***Business Statistics: Chapter 4: Displaying and Describing Categorical Data – Quiz B – Key***

A full service brokerage firm gathered information on how their clients were investing for retirement. Based on age, clients were categorized according to where the largest percentage of their retirement portfolio was invested. The table below summarized the data.

	Age 50 or Younger	Over Age 50	Total
Mutual Funds	30	34	<b>64</b>
Stocks	37	45	<b>82</b>
Bonds	19	23	<b>42</b>
Total	<b>86</b>	<b>102</b>	<b>188</b>

1. Identify the variables and tell whether each is categorical or quantitative.

Mode of investment and age; mode of investment is categorical; age is a quantitative variable. However, in this case investors are grouped according to age therefore the “age category” is relevant and this is categorical.

2. Find each of the following percentages.

- a. What percent of the clients are over age 50 who invests in mutual funds?

18.1% (34/188)

- b. What percent of clients over age 50 invest in mutual funds?

33.3% (34/102)

- c. What percent of the mutual fund investors are over age 50?

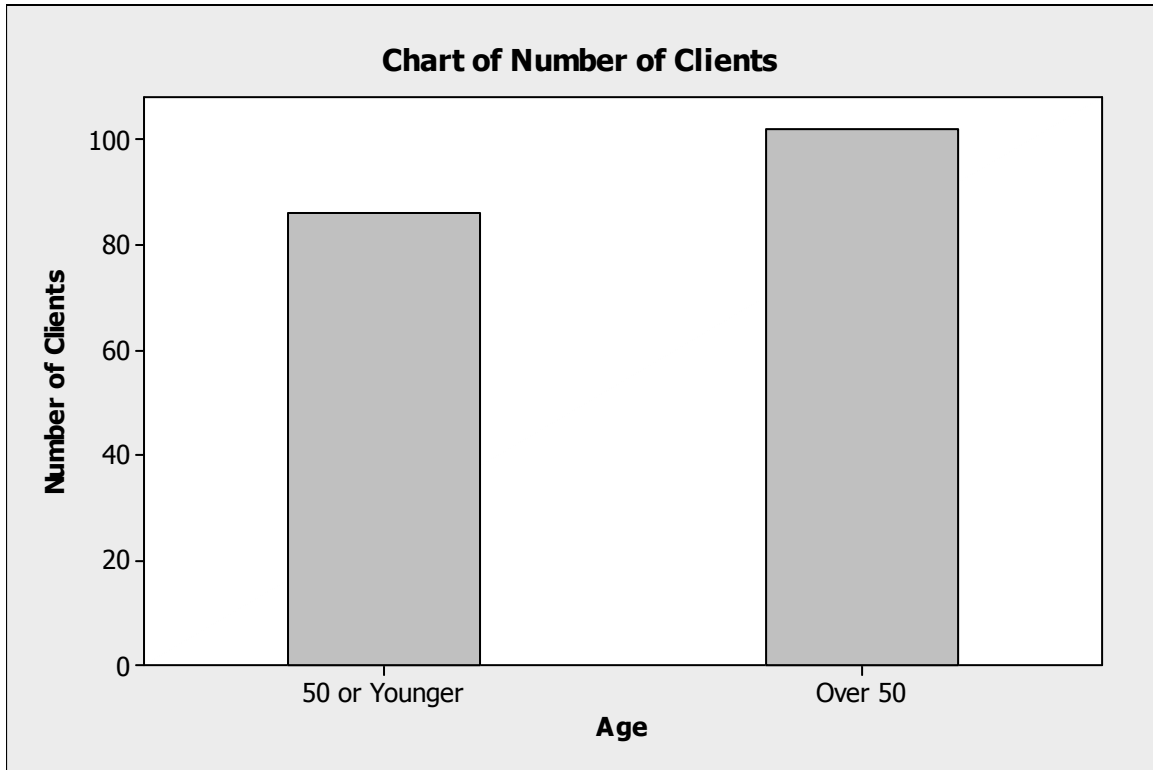
53.1% (34/64)

3. What is the marginal distribution of age?

86 clients are age 50 or younger and 102 are over age 50.

4. Prepare an appropriate chart to display the marginal distribution of age.

Either a bar chart (shown below) or a pie chart is appropriate.

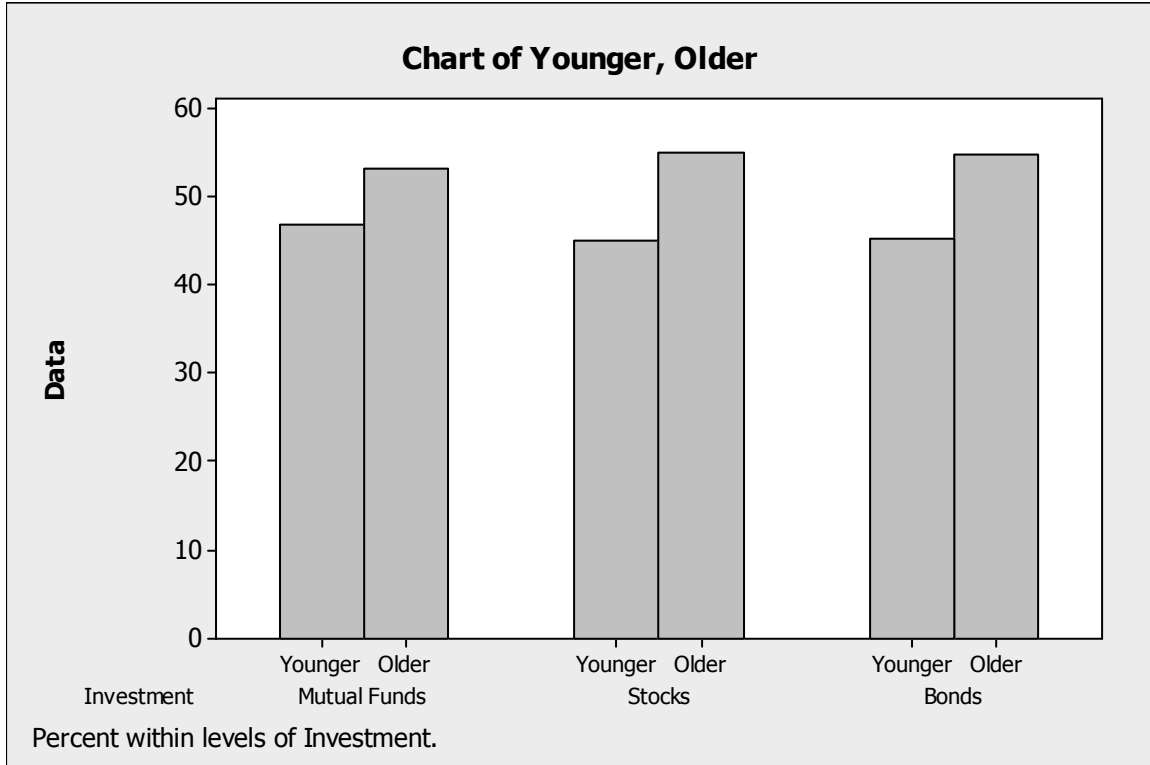


5. Write a sentence or two about the conditional relative frequency distribution of mode of investment for clients age 50 or younger.

More clients (43%) age 50 or younger invested their retirement savings primarily in stocks rather than in any other mode of investment, 35% invested in mutual funds while only 22% invested in bonds.



6. Consider the following side by side bar chart for the data above:



Does the chart indicate that mode of investment is independent of age? Explain.

The way clients invest for retirement does seem to be independent of age. These data provide little indication of a difference in mode of investing for retirement based on clients' ages at this firm.

**Business Statistics: Chapter 4: Displaying and Describing Categorical Data– Quiz C**  
Name \_\_\_\_\_

4.3. Examine a contingency table.

1. A large national retailer of electronics conducted a survey to determine consumer preferences for various brands of digital cameras and the data are summarized in the table shown below. The percentage of consumers who are male and prefer Pentax is

	Female	Male	Total
<b>Sony Cyber-Shot</b>	73	59	<b>132</b>
<b>Kodak – Easy Share</b>	49	47	<b>96</b>
<b>Cannon Power Shot</b>	58	33	<b>91</b>
<b>Pentax</b>	37	41	<b>78</b>
<b>Olympus</b>	45	28	<b>73</b>
<b>Other Brands</b>	86	67	<b>153</b>
<b>Total</b>	<b>348</b>	<b>275</b>	<b>623</b>

- A. 44.1 % (275/623).
- B. 6.6% (41/623).
- C. 52.6% (41/78).
- D. 14.9% (41/275).
- E. 12.5% (78/623).

4.3. Find conditional and marginal distributions.

2. A large national retailer of electronics conducted a survey to determine consumer preferences for various brands of digital cameras and the data are summarized in the table shown below. Of the consumers who are male, the percentage who prefer Pentax is

	Female	Male	Total
<b>Sony Cyber-Shot</b>	73	59	<b>132</b>
<b>Kodak – Easy Share</b>	49	47	<b>96</b>
<b>Cannon Power Shot</b>	58	33	<b>91</b>
<b>Pentax</b>	37	41	<b>78</b>
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<b>Other Brands</b>	86	67	<b>153</b>
<b>Total</b>	<b>348</b>	<b>275</b>	<b>623</b>

- A. 44.1 % (275/623).
- B. 6.6% (41/623).
- C. 52.6% (41/78).
- D. 14.9% (41/275).
- E. 12.5% (78/623).

4.3. Find conditional and marginal distributions.

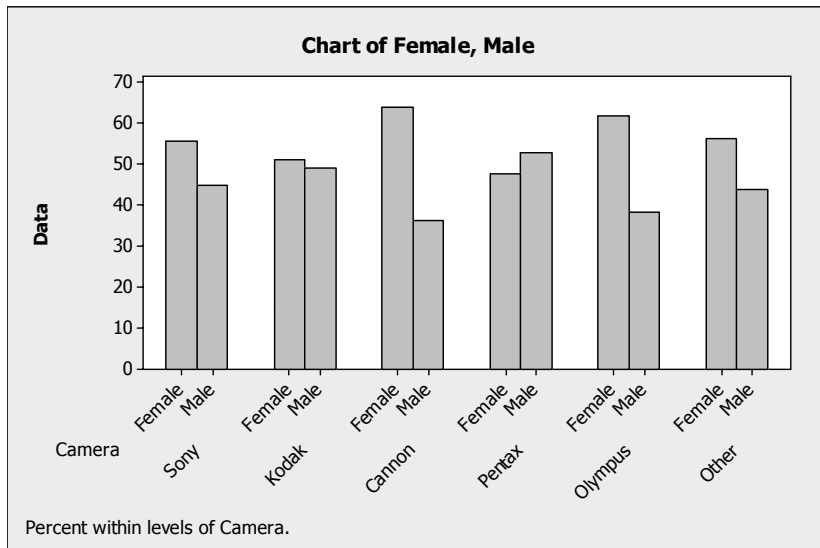
3. A large national retailer of electronics conducted a survey to determine consumer preferences for various brands of digital cameras and the data are summarized in the table shown below. Of the consumers who prefer Pentax, what percentage is male?

	Female	Male	Total
<b>Sony Cyber-Shot</b>	73	59	<b>132</b>
<b>Kodak – Easy Share</b>	49	47	<b>96</b>
<b>Cannon Power Shot</b>	58	33	<b>91</b>
<b>Pentax</b>	37	41	<b>78</b>
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<b>Other Brands</b>	86	67	<b>153</b>
<b>Total</b>	<b>348</b>	<b>275</b>	<b>623</b>

- A. 44.1 % (275/623).
- B. 6.6% (41/623).
- C. 52.6% (41/78).
- D. 14.9% (41/275).
- E. 12.5% (78/623).

4.3. Determine if a display of data is appropriate.

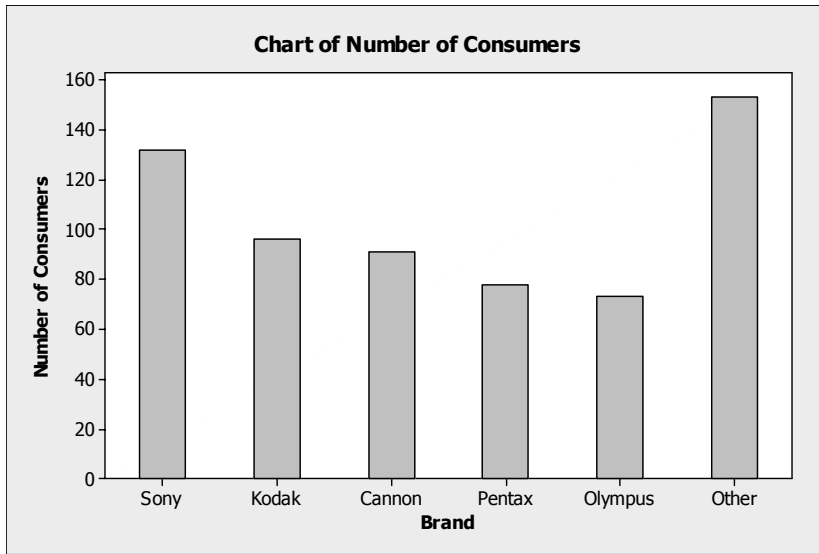
4. Based on the side-by-side bar chart summarizing consumer preferences for various brands of digital cameras by gender, which of the following statements is (are) true?



- A. It appears that camera preference and gender are not related.
- B. It appears that camera preference and gender are not independent.
- C. It appears that camera preference and gender are independent.
- D. More males than females prefer Cannon.
- E. More females than males prefer Pentax.

4.2. Determine if a display of data is appropriate.

5. The following bar chart summarizing consumer preferences for various brands of digital cameras shows



- A. the marginal distribution of brands.
- B. the conditional distribution of brands.
- C. the contingency distribution of brands.
- D. the distribution for a quantitative variable.
- E. none of the above.

4.3. Examine a contingency table.

6. A full service brokerage firm gathered information on how their clients were investing for retirement. Based on age, clients were categorized according to where the largest percentage of their retirement portfolio was invested and shown in the table below. The percentage of clients who are over age 50 and invest in mutual funds is

	Age 50 or Younger	Over Age 50	Total
Mutual Funds	30	34	64
Stocks	37	45	82
Bonds	19	23	42
Total	86	102	188

- A. 3.1% (34/64).
- B. 33.3% (34/102).
- C. 18.1% (34/188).
- D. 34% (64/188).
- E. 54.3% (102/188).

4.3. Find conditional and marginal distributions.

7. A full service brokerage firm gathered information on how their clients were investing for retirement. Based on age, clients were categorized according to where the largest percentage of their retirement portfolio was invested and shown in the table below. Of the clients over age 50, the percentage who invest in mutual funds is

	Age 50 or Younger	Over Age 50	Total
Mutual Funds	30	34	64
Stocks	37	45	82
Bonds	19	23	42
Total	86	102	188

- A. 3.1% (34/64).
- B. 33.3% (34/102).
- C. 18.1% (34/188).
- D. 34% (64/188).
- E. 54.3% (102/188).

4.3. Find conditional and marginal distributions.

8. A full service brokerage firm gathered information on how their clients were investing for retirement. Based on age, clients were categorized according to where the largest percentage of their retirement portfolio was invested and shown in the table below. Of the clients who invest in mutual funds, the percentage over age 50 is

	Age 50 or Younger	Over Age 50	Total
Mutual Funds	30	34	64
Stocks	37	45	82
Bonds	19	23	42
Total	86	102	188

- A. 53.1% (34/64).
- B. 33.3% (34/102).
- C. 18.1% (34/188).
- D. 34% (64/188).
- E. 54.3% (102/188).

4.3. Find conditional and marginal distributions.

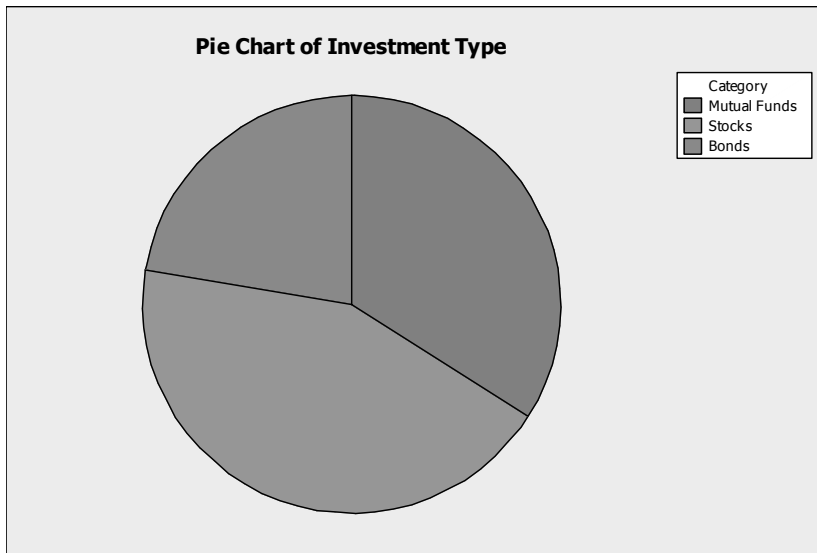
9. A full service brokerage firm gathered information on how their clients were investing for retirement. Based on age, clients were categorized according to where the largest percentage of their retirement portfolio was invested and shown in the table below. The percentage of clients over age 50 is

	Age 50 or Younger	Over Age 50	Total
Mutual Funds	30	34	64
Stocks	37	45	82
Bonds	19	23	42
Total	86	102	188

- A. 3.1% (34/64).
- B. 33.3% (34/102).
- C. 18.1% (34/188).
- D. 34% (64/188).
- E. 54.3% (102/188).

4.2. Determine if a display of data is appropriate.

10. The pie chart below for data collected about clients of brokerage firm shows



- A. the distribution of a quantitative variable.
- B. the contingency distribution of investment type.
- C. the conditional distribution of investment type.
- D. the marginal distribution of investment type.
- E. the joint distribution of investment type.

***Business Statistics: Chapter 4: Displaying and Describing Categorical Data – Quiz C  
– Key***

1. B
2. D
3. C
4. B
5. A
6. C
7. B
8. A
9. E
10. D

***Business Statistics: Chapter 4: Displaying and Describing Categorical Data– Quiz D***  
Name \_\_\_\_\_

4.1. Create and analyze relative frequency distributions.

1. A restaurant uses comment cards to get feedback from its customers about newly added items to the menu. It recently introduced homemade organic veggie burgers. Customers who tried the new burger were asked if they would order it again. The data are summarized in the table below. What percentage of customers would definitely order the veggie burger again?

<b><i>Response</i></b>	<b><i>Frequency</i></b>
<i>Definitely would.</i>	10
<i>Most likely would.</i>	40
<i>Maybe</i>	12
<i>Definitely would not.</i>	3

- A. 10%
- B. 15%
- C. 20%
- D. 40%
- E. 77%

4.1. Create and analyze relative frequency distributions.

2. A restaurant uses comment cards to get feedback from its customers about newly added items to the menu. It recently introduced homemade organic veggie burgers. Customers who tried the new burger were asked if they would order it again. The data are summarized in the table below. What percentage of customers would most likely or definitely order the veggie burger again?

<b><i>Response</i></b>	<b><i>Frequency</i></b>
<i>Definitely would.</i>	10
<i>Most likely would.</i>	40
<i>Maybe</i>	12
<i>Definitely would not.</i>	3

- A. 10%
- B. 15%
- C. 40%
- D. 50%
- E. 77%



- 4.2. Determine if a display of data is appropriate.
3. A restaurant uses comment cards to get feedback from its customers about newly added items to the menu. It recently introduced homemade organic veggie burgers. Customers who tried the new burger were asked if they would order it again. Which of the following would be an appropriate method for displaying the data shown in the table?

<b>Response</b>	<b>Frequency</b>
<i>Definitely would.</i>	10
<i>Most likely would.</i>	40
<i>Maybe</i>	12
<i>Definitely would not.</i>	3

- A. Contingency table.
- B. Segmented bar chart.
- C. Pie chart.
- D. Both A and B.
- E. Both B and C.

- 4.3. Determine if a display of data is appropriate.
4. In May, 2010, the *Pew Research Center for the People & the Press* carried out a national survey to gauge opinion on the Arizona Immigration Law. Responses (*Favor*, *Oppose*, *Don't Know*) were examined according to groups defined by political party affiliation (*Democrat*, *Republican*, *Independent*). Which of the following would be appropriate for displaying these data?

- A. Contingency table.
- B. Pie charts.
- C. Segmented bar chart.
- D. Side by side bar chart.
- E. All of the above.

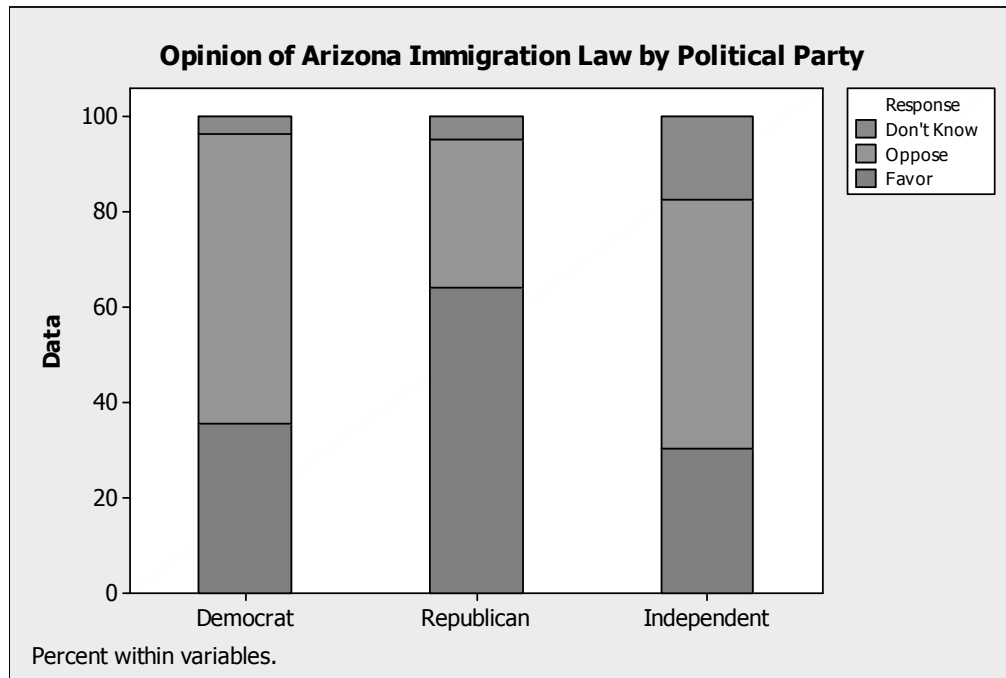
- 4.3. Examine a contingency table.
5. A regional survey was carried out to gauge public opinion on the controversial Arizona Immigration Law (results shown below). How many respondents are Republican and favor the law?

<b>Response</b>	<b>Democrat</b>	<b>Republican</b>	<b>Independent</b>
<i>Favor</i>	50	93	35
<i>Oppose</i>	85	45	60
<i>Don't Know</i>	5	7	20

- A. 93
- B. 45
- C. 145
- D. 7
- E. 85

4.3. Determine if a display of data is appropriate.

6. A regional survey was carried out to gauge public opinion on the controversial Arizona Immigration Law. The results are displayed in the segmented bar chart below. Which of the following statements is true?



- A. A greater percentage of Republicans oppose the law compared to Democrats.
- B. A greater percentage of Republicans oppose the law compared to Independents.
- C. Opinion about the law appears to be independent of political party affiliation.
- D. A greater percentage of Democrats oppose the law compared to Republicans.
- E. The segmented bar chart is not appropriate for these data.

4.3. Find conditional and marginal distributions.

7. A regional survey was carried out to gauge public opinion on the controversial Arizona Immigration Law. Based on the results displayed in the table below, what percent of respondents is Independent?

<b>Response</b>	<b><i>Democrat</i></b>	<b><i>Republican</i></b>	<b><i>Independent</i></b>
<b><i>Favor</i></b>	50	93	35
<b><i>Oppose</i></b>	85	45	60
<b><i>Don't Know</i></b>	5	7	20

- A. 35%
- B. 9%
- C. 29%
- D. 45%
- E. 25%

4.3. Find conditional and marginal distributions.

8. A regional survey was carried out to gauge public opinion on the controversial Arizona Immigration Law (results shown below). What percent oppose the law?

<b>Response</b>	<b><i>Democrat</i></b>	<b><i>Republican</i></b>	<b><i>Independent</i></b>
<b><i>Favor</i></b>	50	93	35
<b><i>Oppose</i></b>	85	45	60
<b><i>Don't Know</i></b>	5	7	20

- A. 48%
- B. 45%
- C. 32%
- D. 25%
- E. 61%

4.3. Find conditional and marginal distributions.

9. A regional survey was carried out to gauge public opinion on the controversial Arizona Immigration Law (results shown below). Of respondents who are Democrat, what percent oppose the law?

<b>Response</b>	<b><i>Democrat</i></b>	<b><i>Republican</i></b>	<b><i>Independent</i></b>
<b><i>Favor</i></b>	50	93	35
<b><i>Oppose</i></b>	85	45	60
<b><i>Don't Know</i></b>	5	7	20

- A. 13%
- B. 35%
- C. 22%
- D. 45%
- E. 61%

4.3. Find conditional and marginal distributions.

10. A regional survey was carried out to gauge public opinion on the controversial Arizona Immigration Law (results shown below). Of respondents who oppose the law, what percent is Democrat?

<b>Response</b>	<b><i>Democrat</i></b>	<b><i>Republican</i></b>	<b><i>Independent</i></b>
<b><i>Favor</i></b>	50	93	35
<b><i>Oppose</i></b>	85	45	60
<b><i>Don't Know</i></b>	5	7	20

- A. 13%
- B. 35%
- C. 22%
- D. 45%
- E. 61%

***Business Statistics: Chapter 4: Displaying and Describing Categorical Data – Quiz D  
– Key***

1. B
2. E
3. C
4. E
5. A
6. D
7. C
8. A
9. E
10. D