1. A group of 356 male federal employees were classified according to their socioeconomic status (SES) with categories High, Middle, and Low, and their smoking status. The data are summarized in the following contingency table.

<table>
<thead>
<tr>
<th>Smoking</th>
<th>SES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Current</td>
<td>51</td>
</tr>
<tr>
<td>Former</td>
<td>92</td>
</tr>
<tr>
<td>Never</td>
<td>68</td>
</tr>
</tbody>
</table>

What proportion of Current smokers are in the High SES category?

(a) 51/211  
(b) 211/356  
(c) 51/356  
(d) 51/116  
(e) None of the above

2. Based on the same SES versus smoking data as in the above question, what proportion of those in the high SES category are current smokers?

(a) 51/211  
(b) 211/356  
(c) 51/356  
(d) 51/116  
(e) None of the above

Solution of 1 and 2. There are 51 + 22 + 43 = 116 current smokers, of whom 51 are in the high SES category, so the answer to Question 1 is 51/116.

There are 51 + 92 + 68 = 211 people in the high SES category, of whom 51 are current smokers, so the answer to Question 2 is 51/211.

3. Data were collected on the calorie content of various brands of hot dogs, classified by type (beef, meat, poultry). The data are summarized in the following boxplot.
Choose the best answer.

(a) The median calorie content for Poultry hot dogs is lower than the median calorie content for meat hot dogs.

(b) The third quartile of calorie contents for Poultry hot dogs is lower than the median calorie content for Beef hot dogs.

(c) The median calorie content of Beef hot dogs is greater than 160.

(d) Both (a) and (b) are true.

(e) None of the above are true.

**Solution.** The correct answer is (d).

4. Data were collected on the calorie content of various brands of hot dogs, classified by type (beef, meat, poultry). The data are summarized in the following boxplot.
Choose the best answer.

(a) The median calorie content for Poultry hot dogs is higher than the median calorie content for meat hot dogs.
(b) The third quartile of calorie contents for Poultry hot dogs is lower than the first quartile of calorie content for Beef hot dogs.
(c) The median calorie content of Beef hot dogs is greater than 160.
(d) Both (a) and (b) are true.
(e) None of the above are true.

Solution. The correct answer is (e).

5. A group of fifth grade students were given a reading test. Here are some summary statistics computed from their scores.

- Median = 98.5
- First Quartile = 93
- Third Quartile = 106
- Mean = 98.8

Based on this information, choose the best answer.

(a) Approximately 1/4 of the scores are less than 106.
(b) Approximately 1/2 of the scores are less than 98.5.
(c) Approximately 1/2 of the scores are between 93 and 106.
(d) None of the above are true.
(e) Both (b) and (c) are true.

**Solution.** We know that approximately 3/4 of the scores are lower than 106, that approximately 1/2 of the scores are lower than 98.5, and that approximately 1/2 of the scores are between 93 and 106. So (e) is correct.

6. A group of fifth grade students were given a reading test. Here are some summary statistics computed from their scores.

- Median = 98.5
- First Quartile = 93
- Third Quartile = 106
- Mean = 98.8
- Standard deviation = 18.92.

One of the students got a score of 67. Based on this information, choose the best answer. Note that I have rounded all answers to have two digits to the right of the decimal point.

(a) The student’s $z$-score is 2.25.
(b) The student’s $z$-score is $-1.68$.
(c) The student’s $z$-score is 18.92.
(d) None of the above are true.

**Solution.** The $z$-score is

$$z = \frac{67 - 98.8}{18.92} \approx -1.68.$$

So (b) is correct.

7. As part of a study of risk factors for heart disease, the cholesterol level of 62 people were measured. The $z$-score for one person’s cholesterol level was computed to be $-2.75$. Choose the best answer.

(a) The person’s cholesterol level is less than the mean cholesterol level.
(b) The person’s cholesterol level is 2.75 quartiles below the median cholesterol level.
(c) The person’s cholesterol level is equal to $-2.75$.
(d) Both (a) and (b) are true.
(e) None of the above are true.

**Solution.** Since the $z$-score is negative, we know that (a) is true. Choice (b) is a nonsensical statement, as is choice (c). So (a) is the correct answer.