   a. Make a dot plot that displays this situation.

b. Suppose you use only the information about whether a person is in the protected class (aged 40 or older), rather than the exact age. Do you then have evidence for possible age discrimination? Explain.

c. This time, use only the information about whether a person is aged 50 or more. Does the evidence using age 50 provide stronger or weaker support for a case of possible age discrimination than using age 40? Explain.
2. The table below shows the ages and lay off status of 75 workers at a manufacturing plant. Choose the statement that best expresses the conclusion you would draw from these data.

<table>
<thead>
<tr>
<th>Laid Off</th>
<th>Number of Younger Workers</th>
<th>Number of Older Workers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13</td>
<td>33</td>
<td>46</td>
</tr>
<tr>
<td>Not Laid Off</td>
<td>5</td>
<td>24</td>
<td>29</td>
</tr>
</tbody>
</table>

| Total    | 18                        | 57                      | 75    |

A. There may be discrimination against older workers because more older workers were laid off.
B. There may be discrimination against older workers because a larger proportion of older workers was laid off.
C. There may be discrimination against younger workers because more younger workers were laid off.
D. There may be discrimination against younger workers because a larger proportion of younger workers was laid off.
E. There is no evidence of discrimination because older and younger workers were just as likely to be laid off.

3. In her promotional practices, a queen ant has been accused of discriminating against ants with short antennae. During the preceding year, six workers were up for promotion. Four of them, with antenna lengths (in mm) of 65, 71, 72, and 73, were promoted. Two workers, with antenna lengths of 63 and 68, were bypassed for promotion.

a. What is the average antenna length of the workers who were bypassed?

b. Describe a simulation for finding the distribution of the average antenna length of two workers bypassed at random.
4. Dog Day Obedience School has been accused of rejecting dogs with long tails. The most recent data show that out of nine dogs considered for the school, two dogs were rejected (average tail length = 44 cm). The following dot plot shows the distribution of average tail lengths of rejected dogs for a simulation that modeled a situation in which two of the nine dogs were randomly selected. Does this dot plot show strong evidence that Dog Day Obedience School should be asked to explain why it rejected dogs with long tails? Choose the statement that best expresses your answer.

A. Yes, it is unlikely to get an average tail length this long or longer just by chance alone.
B. Yes, they must have discriminated because 44 cm is longer than the average tail length.
C. No, it is easy to get an average tail length this long or longer just by chance alone.
D. No, 44 cm isn’t that much longer than the average tail length.
E. Statistics can’t be used to answer this question.
5. This table lists the total number of home runs for each American League baseball team in 1989. Use it to respond to parts a–b.

<table>
<thead>
<tr>
<th>Team</th>
<th>Home Runs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baltimore</td>
<td>129</td>
</tr>
<tr>
<td>Boston</td>
<td>108</td>
</tr>
<tr>
<td>Anaheim</td>
<td>145</td>
</tr>
<tr>
<td>Chicago</td>
<td>94</td>
</tr>
<tr>
<td>Cleveland</td>
<td>127</td>
</tr>
<tr>
<td>Detroit</td>
<td>116</td>
</tr>
<tr>
<td>Kansas</td>
<td>101</td>
</tr>
<tr>
<td>Milwaukee</td>
<td>126</td>
</tr>
<tr>
<td>Minnesota</td>
<td>117</td>
</tr>
<tr>
<td>New York</td>
<td>130</td>
</tr>
<tr>
<td>Oakland</td>
<td>127</td>
</tr>
<tr>
<td>Seattle</td>
<td>134</td>
</tr>
<tr>
<td>Texas</td>
<td>122</td>
</tr>
<tr>
<td>Toronto</td>
<td>142</td>
</tr>
</tbody>
</table>

a. Make a stem-and-leaf plot. (12 | 9 should mean 129 home runs.)

b. Sketch a box-and-whisker plot and indicate the five-summary points (minimum, lower quartile, etc.). Also label any outliers.
6. In a random sample of 39 adults, each adult was asked to report the amount of his or her last cell phone bill in dollars. The stem-and-leaf plot of the results is shown here.

1 | 99
2 | 023
2 | 568
3 | 003
3 | 679
4 | 12244
4 | 5556667778
5 | 0012334
5 | 55
6 | 0

2 | 6 means the bill was $26.

Which of the following best describes the shape of this distribution?

A. Normal distribution; mean equals median
B. Uniform distribution with outliers on low end
C. Skewed distribution; mean greater than median
D. Skewed distribution; mean less than median
E. Skewed distribution with outliers on low end

7. Which of the following boxplots best represents the data in question 6?

A. 

B. 

C. 

D. 

E. None of the boxplots represents the data.
8. Consider the following set of numbers: 2, 8, 8, 10, 15, 25, 25, 32, 40.
   a. Find the mean and the median.

   b. Replace the maximum value of the data set with the value 50. How does this change affect the mean? The median?

   c. If you double all the values in the original data set, how does this change affect the original mean and standard deviation?

   d. If you add 10 to all values in the original data set, how does this change affect the original mean and standard deviation?

9. Prices of condominiums in a certain city are approximately normally distributed with a mean value of about $100,000 and a standard deviation of about $10,000.
   a. What approximate proportion of the condominiums have a value less than $90,000?
      A. 16%   B. 32%   C. 37%   D. 48%   E. 68%

   b. The two values representing the endpoints of the middle 95% of the distribution of condominium prices in this particular city are about
      A. $75,000; $125,000
      B. $80,400; $119,600
      C. $83,500; $116,500
      D. $90,000; $110,000
      E. $95,000; $105,000
c. Find the $z$-score for a condominium value of $115,000$.

d. What price for a condominium in this particular city is at the 20th percentile?

10. This frequency table gives the number of phones per household in a random sample of 100 households in the United States.

<table>
<thead>
<tr>
<th>Number of Phones per Household</th>
<th>Number of Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
</tr>
</tbody>
</table>

a. Compute the mean number of phones per household.

b. Compute the standard deviation $s$ of the number of phones per household.
11. A magazine asks readers to write in saying whether they agree with a statement about dating. What, potentially, is the main problem with this survey?

A. Bias due to voluntary response  
B. Too much variability in the opinions  
C. Size bias  
D. A lurking variable  
E. Bias due to judgment sampling

12. Identify which type of sampling design is being used in each scenario. Choose from:
(1) Simple Random Sampling  
(2) Stratified Random Sampling  
(3) Cluster Sampling  
(4) Two Stage Sampling  
(5) Systematic Sampling with Random Start.

a. A school administrator randomly selects 12 classes from your school and then randomly selects five students from each class to study a school library issue.

Sampling: _______________________________  

b. A school administrator uses random numbers to select a sample of 60 students from the roster of students enrolled in your school.

Sampling: _______________________________  

c. A school administrator gets a sample of 60 students from your school by randomly selecting 15 freshmen, 15 sophomores, 15 juniors, and 15 seniors.

Sampling: _______________________________  

d. A school administrator uses the roster of students enrolled in your school to select a sample of students by randomly choosing a person from among the first 20 and then taking every 20th name on the roster thereafter.

Sampling: _______________________________