1. (8 points) In each case tell whether the information given is at the nominal, ordinal, interval, or ratio level of measurement. The number or word in parentheses indicates what data you are to classify.
   (a) The high temperature today was 100 degrees Fahrenheit. (100)
   (b) That team placed 5th best in the league. (5th)

2. (8 points) In each case tell whether the sample is being selected by random, systematic, cluster, stratified, or convenience sampling.
   (a) A college wishes to survey a sample of its freshmen. It puts all their names on individual slips of paper, puts them all in a box, mixes it up thoroughly, then someone with eyes closed picks 50 of the slips of paper.
   (b) A college wants to survey a sample of its freshmen. It puts all their names in alphabetical order, then chooses every 10th name.

3. (8 points) Make a Pareto Chart for the following data.

<table>
<thead>
<tr>
<th>Flavor of Ice Cream</th>
<th>Number of Cones Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chocolate</td>
<td>30</td>
</tr>
<tr>
<td>Vanilla</td>
<td>45</td>
</tr>
<tr>
<td>Coffee</td>
<td>10</td>
</tr>
<tr>
<td>Strawberry</td>
<td>20</td>
</tr>
</tbody>
</table>

4. (10 points) In a shipment of 100 apples 70 are rotten, 40 are wormy, and 20 are both rotten and wormy. If one apple is chosen at random, what is the probability that it is either rotten or wormy?
5. (10 points) You want to make a confidence Interval for the proportion of people in a certain state who support the death penalty. You want the confidence level to be 95% and the error to be at most 0.02. Previous studies suggest the proportion is near 0.57. How large should your sample size be?

6. (10 points) In a certain high school 70% of the students like mathematics. Suppose 12 of them are selected at random with replacement.
   (a) What is the probability that exactly 10 of them like mathematics?
   (b) What is the probability that at least 10 of them like mathematics?

7. (12 points) Find the mean, median, mode, and midrange for the following list of data.

   5 5 5 6 8 9 9 11 13 15

8. (12 points) Consider the following list of data.

   2 6 7 9 10 13 15 17 18 19 22 25

   (a) Find the percentile of the data value 18.
   (b) Find the value of the 20\textsuperscript{th} percentile $P_{20}$.

9. (12 points) The weights of cookies produced by a certain machine have a mean of 0.72 ounces with a standard deviation of 0.14 ounces. If a simple random sample of 50 of those cookies is taken, what is the probability that the mean weight of that sample is greater than 0.73 ounces?

10. (10 points) A simple random sample of 60 students from a certain university has a mean GPA of 3.16 with a sample standard deviation of 0.37. Construct a 90% confidence interval for the mean GPA of all students from that university.
Name:_________________________

MAT 121 Final Exam May 10, 2010 Version 2 Page 1

There are 10 questions. Do all parts of all questions. Show the work you do to obtain an answer. A calculator and your textbook are allowed. No other books or notes are allowed. Make sure you have seen and understand the material in the syllabus about what sort of notes you are allowed to put in your book. Do not share calculators.

Put your name on your blue book. Put all the work you wish to have graded in your blue book. Turn in both your exam and your blue book together. When you turn in your exam make sure your name gets checked off the list as having turned in the exam.

1. (8 points) In each case tell whether the information given is at the nominal, ordinal, interval, or ratio level of measurement. The number or word in parentheses indicates what data you are to classify.
   (a) The official color of SU is orange. (orange)
   (b) The tuition at SU is $23,424. (23,424)

2. (8 points) In each case tell whether the sample is being selected by random, systematic, cluster, stratified, or convenience sampling.
   (i) You want to predict the outcome of a university wide election, so you ask everyone you meet on your dorm floor this evening whom they intend to vote for.
   (ii) A store asks a pollster to ask every 15th customer leaving the store whether they thought the sales people in the store were polite

3. (8 points) Make a Pareto Chart for the following data.

<table>
<thead>
<tr>
<th>Flavor of Ice Cream</th>
<th>Number of Cones Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chocolate</td>
<td>40</td>
</tr>
<tr>
<td>Vanilla</td>
<td>20</td>
</tr>
<tr>
<td>Coffee</td>
<td>50</td>
</tr>
<tr>
<td>Strawberry</td>
<td>15</td>
</tr>
</tbody>
</table>

4. (10 points) In a shipment of 100 apples 40 are rotten, 60 are wormy, and 30 are both rotten and wormy. If one apple is chosen at random, what is the probability that it is either rotten or wormy?

Go to next page
5. (10 points) You want to make a confidence interval for the proportion of people in a certain state who support the death penalty. You want the confidence level to be 99% and the error to be at most 0.03. Previous studies suggest the proportion is near 0.63. How large should your sample size be?

6. (10 points) In a certain high school 80% of the students like mathematics. Suppose 13 of them are selected at random with replacement.
   (a) What is the probability that exactly 11 of them like mathematics?
   (b) What is the probability that at least 11 of them like mathematics?

7. (12 points) Find the mean, median, mode, and midrange for the following list of data.
   2  3  3  7  9  10  11  15  15  15

8. (12 points) Consider the following list of data.
   2  6  7  9  10  13  15  17  18  19  22  25
   (a) Find the percentile of the data value 10.
   (b) Find the value of the 70th percentile P_{70}.

9. (12 points) The weights of cookies produced by a certain machine have a mean of 0.76 ounces with a standard deviation of 0.12 ounces. If a simple random sample of 40 of those cookies is taken, what is the probability that the mean weight of that sample is greater than 0.78 ounces?

10. (10 points) A simple random sample of 50 students from a certain university has a mean GPA of 3.13 with a sample standard deviation of 0.24. Construct a 95% confidence interval for the mean GPA of all students from that university.
1. (8 points) In each case tell whether the information given is at the nominal, ordinal, interval, or ratio level of measurement. The number or word in parentheses indicates what data you are to classify.
   (a) The color of my car is gray. (gray)
   (b) My car was built in 1989. (1989)

2. (8 points) In each case tell whether the sample is being selected by random, systematic, cluster, stratified, or convenience sampling.
   (a) A college wishes to conduct a survey of its freshman class. It puts the names of all the freshmen in alphabetical order, then picks every 20th name and interviews them.
   (b) An opinion research firm wants to make a national survey. Knowing the population is 52% female, 48% male, it randomly chooses 520 females and 480 males to make a sample of 1000.

3. (8 points) Make a Pareto Chart for the following data.

<table>
<thead>
<tr>
<th>Flavor of Ice Cream</th>
<th>Number of Cones Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chocolate</td>
<td>50</td>
</tr>
<tr>
<td>Vanilla</td>
<td>10</td>
</tr>
<tr>
<td>Coffee</td>
<td>30</td>
</tr>
<tr>
<td>Strawberry</td>
<td>25</td>
</tr>
</tbody>
</table>

4. (10 points) In a shipment of 100 apples 20 are rotten, 40 are wormy, and 10 are both rotten and wormy. If one apple is chosen at random, what is the probability that it is either rotten or wormy?

Go to next page
5. (10 points) You want to make a confidence interval for the proportion of people in a certain state who support the death penalty. You want the confidence level to be 90% and the error to be at most 0.01. Previous studies suggest the proportion is near 0.58. How large should your sample size be?

6. (10 points) In a certain high school 90% of the students like mathematics. Suppose 14 of them are selected at random with replacement.
   (a) What is the probability that exactly 12 of them like mathematics?
   (b) What is the probability that at least 12 of them like mathematics?

7. (12 points) Find the mean, median, mode, and midrange for the following list of data.

6 6 6 7 9 10 10 12 14 16

8. (12 points) Consider the following list of data.

2 6 7 9 10 13 15 17 18 19 22 25

   (a) Find the percentile of the data value 15.
   (b) Find the value of the 30th percentile \( P_{30} \).

9. (12 points) The weights of cookies produced by a certain machine have a mean of 0.71 ounces with a standard deviation of 0.13 ounces. If a simple random sample of 45 of those cookies is taken, what is the probability that the mean weight of that sample is greater than 0.73 ounces?

10. (10 points) A simple random sample of 70 students from a certain university has a mean GPA of 3.17 with a sample standard deviation of 0.21. Construct a 99% confidence interval for the mean GPA of all students from that university.
1. (8 points) In each case tell whether the information given is at the nominal, ordinal, interval, or ratio level of measurement. The number or word in parentheses indicates what data you are to classify.
   (a) My car has been driven 20,000 miles. (20,000)
   (b) John placed 6th in the race. (6)

2. (8 points) In each case tell whether the sample is being selected by random, systematic, cluster, stratified, or convenience sampling.
   (a) A college wishes to survey a sample of its freshmen. It puts all their names on individual slips of paper, puts them all in a box, mixes it up thoroughly, then someone with eyes closed picks 50 of the slips of paper.
   (b) A marketing firm wishes to conduct a mail survey of the country. It randomly selects 50 different zip codes, then mails the survey to everyone in each zip code.

3. (8 points) Make a Pareto Chart for the following data.

<table>
<thead>
<tr>
<th>Flavor of Ice Cream</th>
<th>Number of Cones Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chocolate</td>
<td>10</td>
</tr>
<tr>
<td>Vanilla</td>
<td>40</td>
</tr>
<tr>
<td>Coffee</td>
<td>35</td>
</tr>
<tr>
<td>Strawberry</td>
<td>60</td>
</tr>
</tbody>
</table>

4. (10 points) In a shipment of 100 apples 30 are rotten, 50 are wormy, and 20 are both rotten and wormy. If one apple is chosen at random, what is the probability that it is either rotten or wormy?
5. (10 points) You want to make a confidence interval for the proportion of people in a certain state who support the death penalty. You want the confidence level to be 99% and the error to be at most 0.04. Previous studies suggest the proportion is near 0.48. How large should your sample size be?

6. (10 points) In a certain high school 95% of the students like mathematics. Suppose 15 of them are selected at random with replacement.
   (a) What is the probability that exactly 13 of them like mathematics?
   (b) What is the probability that at least 13 of them like mathematics?

7. (12 points) Find the mean, median, mode, and midrange for the following list of data.

   4  5  5  9  11  12  13  17  17  17

8. (12 points) Consider the following list of data.

   2  6  7  9  10  13  15  17  18  19  22  25

   (a) Find the percentile of the data value 9.
   (b) Find the value of the 60th percentile $P_{60}$.

9. (12 points) The weights of cookies produced by a certain machine have a mean of 0.85 ounces with a standard deviation of 0.15 ounces. If a simple random sample of 55 of those cookies is taken, what is the probability that the mean weight of that sample is greater than 0.87 ounces?

10. (10 points) A simple random sample of 80 students from a certain university has a mean GPA of 3.12 with a sample standard deviation of 0.29. Construct a 95% confidence interval for the mean GPA of all students from that university.