Show your work for each of the problems. Correct answers without supporting work will receive minimal credit.

1. [6 points] A fast food place records the sales of their burgers. One day they sold the following.

<table>
<thead>
<tr>
<th>Kind</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular Burger</td>
<td>245</td>
</tr>
<tr>
<td>Bacon Burger</td>
<td>70</td>
</tr>
<tr>
<td>Cheeseburger</td>
<td>180</td>
</tr>
<tr>
<td>Bacon &amp; Cheese Burger</td>
<td>165</td>
</tr>
</tbody>
</table>

Create a pie chart to represent this data. Be sure to include labels for the pie chart and a title. Your graph will be graded on the size accuracy of the "pie slices" and appropriate labeling.
2. [6 points] The following frequency table summarizes the number of correct answers of a UCLA history class that took a 15-point quiz.
   a) Create a frequency table for this data using categories 1-3, 4-6, 7-9, 10-12, and 13-15.
   b) Draw a histogram for the grouped data created in part a (above).

<table>
<thead>
<tr>
<th># correct ans</th>
<th>#students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>26</td>
</tr>
<tr>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>12</td>
<td>26</td>
</tr>
<tr>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>15</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># correct</th>
<th>freq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>11</td>
</tr>
<tr>
<td>4-6</td>
<td>35</td>
</tr>
<tr>
<td>7-9</td>
<td>62</td>
</tr>
<tr>
<td>10-12</td>
<td>63</td>
</tr>
<tr>
<td>13-15</td>
<td>29</td>
</tr>
</tbody>
</table>
3. [6 points] Given the scores 3, 5, 6, 4, 3, 6, 2, 2, 3, 5, find: 

\[ \text{in order: } 2, 2, 2, 3, 3, 3, 4, 5, 5, 5, 6, 6 \]

a) the mode and explain or show how you determine this number.

\[ \text{Mode} = 3 \text{ since } 3 \text{ has greatest \# occurrences} \]

b) the median and explain or show how you determine this number.

\[ \text{Median} = \frac{3 + 4}{2} \text{ median is midpoint of } 2 \text{ middle scores} \]

When \# scores is \( n \) even. \( (n = 10) \)

c) the mean and explain or show how you determine this number.

\[ \text{Mean} = \frac{2(2) + 3(3) + 4(1) + 5(2) + 6(2)}{10} = \frac{39}{10} = 3.9 \]

\[ \text{Mean is sum of scores divided by \# of scores.} \]

4. [6 points] A survey of a class on the number of hours spent studying for a final exam is summarized below.

<table>
<thead>
<tr>
<th>Hours of Study</th>
<th>Frequency</th>
<th>Class midpr</th>
<th>( m )</th>
<th>( m \cdot f )</th>
<th>( m \cdot (x - \mu)^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 4</td>
<td>6</td>
<td>2</td>
<td>12</td>
<td>72</td>
<td>6(2 - 9.2)^2 = 311.04</td>
</tr>
<tr>
<td>5 - 9</td>
<td>10</td>
<td>7</td>
<td>70</td>
<td>700</td>
<td>10(7 - 9.2)^2 = 48.4</td>
</tr>
<tr>
<td>10 - 14</td>
<td>9</td>
<td>12</td>
<td>108</td>
<td>972</td>
<td>9(12 - 9.2)^2 = 70.48</td>
</tr>
<tr>
<td>15 - 19</td>
<td>5</td>
<td>17</td>
<td>85</td>
<td>425</td>
<td>5(17 - 9.2)^2 = 304.8</td>
</tr>
<tr>
<td># scores = 30</td>
<td></td>
<td>total of scores = 275</td>
<td></td>
<td></td>
<td>total of squares = 734.2</td>
</tr>
</tbody>
</table>

\[ \text{a) Use the formula for the mean to estimate the mean number of hours studying.} \]

\[ \text{Mean } \mu = \frac{2(6) + 7(10) + 9(9) + 12(3)}{30} = \frac{275}{30} = 9.166.. \approx 9.2 \]

\[ \text{b) Use the formula for the standard deviation to estimate the standard deviation for the number of hours studied for the final exam.} \]

\[ \text{Std dev } \sigma = \sqrt{\frac{6(2 - 9.2)^2 + 10(7 - 9.2)^2 + 9(8 - 9.2)^2 + 5(17 - 9.2)^2}{30}} = \sqrt{\frac{734.2}{30}} = \sqrt{24.473} \approx 4.94705.. \approx 4.95} \]
5. [6 points] A student finished 12th in a class of 250 students. Find the student's percentile.

Students rank 12th in 250 so there are 11 ahead of her. Thus 249 (including herself) score the same or less.

Percentile: \( \frac{239}{250} = 0.956 \) = percentage that she scores as well or better than.

Her percentile is the 95.6th.

The following problems are from "Math of Finance". Be sure to identify the formula you use for each problem.

6. [6 points] How much interest is paid on a $1250 loan at 8% simple interest for 15 months?

\[
I = P \cdot r \cdot t
\]

where

\[
I = \, ?
\]
\[
P = 1250
\]
\[
r = 0.08 \text{ per year}
\]
\[
t = 15 \text{ months} = \frac{15}{12} \text{ years}
\]

\[
I = (1250)(0.08)(\frac{15}{12})
\]

\[
I = $125
\]
7. [6 points] How much should a bank pay for a 30-day $2 million Treasury bill in order to earn 7.2% simple discount?

\[ P_r = M (1 - dt) \]

\[ P_r = \, ? \]
\[ M = \2,000,000 \]
\[ d = .072 \text{ per year} \]
\[ t = 30 \text{ days} = \frac{30}{360} \text{ yr.} \]

\[ P_r = M (1 - dt) \]
\[ P_r = 2,000,000 \left(1 - (0.072)\left(\frac{30}{360}\right)\right) \]
\[ P_r = 2,000,000 \left(1 - 0.006\right) \]
\[ P_r = 2,000,000 \times 0.994 \]
\[ P_r = \$1,988,000.00 \]

8. [6 points] How much should be invested at 8% compounded quarterly in order to have $10,000 at the end of four years?

\[ A = P \left(1 + \frac{i}{n}\right)^n \]

\[ A = 10,000 \]
\[ P = \, ? \]
\[ i = \frac{0.08}{4} = 0.02 \text{ quarterly rate} \]
\[ n = 4(4) = 16 \text{ quarters} \]

\[ A = P \left(1 + \frac{r}{n}\right)^n \]
\[ 10,000 = P \left(1 + \frac{0.08}{4}\right)^{4 \times 4} \]
\[ 10,000 = P \left(1 + 0.02\right)^{16} \]
\[ 10,000 = P \left(1.02\right)^{16} \]
\[ 10,000 = P \left(1.372785705\right) \]
\[ 7284.46 = P \]
9. [6 points] Find the amount of an annuity with $500 deposited quarterly at 6% for eight years. Then determine the amount of interest earned on this investment.

\[ A = R \left[ \frac{(1+i)^n - 1}{i} \right] \]

\( A = ? \)

\( R = 500 \)

\( i = \frac{0.06}{4} = 0.015 \text{ per quarter} \)

\( n = 8(4) = 32 \text{ quarters} \)

\( A = 500 \left[ (1.015)^{32} - 1 \right] \cdot 0.015 \)

\( A = 500 \cdot 40.62828801 \)

\( A = 20,344.14 \)

b) \( \text{INTEREST} = \text{FUTURE VALUE} - \text{PRESENT VALUE} = 20,344.14 - 500(32) \)

\( \text{I} = 469.53 \)

10. [6 points] Kesha obtained a 36-month loan of $15,200 on a car. The interest rate was 7%. Find

a) the size of her monthly payments.

b) the total amount of interest she pays on this loan.

\[ P_r = R \left[ \frac{1 - (1+i)^{-n}}{i} \right] \]

\( P_r = 15,200 \)

\( i = \frac{0.07}{12} \text{ per month} \)

\( n = 36 \text{ months} \)

\[ P_r = R \left[ \frac{1 - (1+i)^{-n}}{i} \right] \]

\( P_r = 15,200 \left[ \frac{1 - (1 + \frac{0.07}{12})^{-36}}{\frac{0.07}{12}} \right] \)

\( 15,200 = R \left[ 32.38646444 \right] \)

\( \$469.53 = R \)

b) \( \text{INTEREST} = \text{TOTAL PAYMENTS} - \text{LOAN AMOUNT} = 36(469.53) - 15,200.00 \)

\( \text{I} = \$1695.88 \)