Quiz 2

Please show your work in all the problems to get full credit.

**Problem 1:** The following data represents the alcohol content of 7 randomly selected beers:

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8.5</td>
<td>9</td>
<td>8.5</td>
<td>9.5</td>
<td>8</td>
<td>8</td>
<td>5</td>
</tr>
</tbody>
</table>

(1) Calculate the Variance and Standard Deviation of the Alcohol Content

**Variance=2.119048, Standard Deviation=1.455695.** Other statistics are Min=5.000, 1st Qu=8.000, Median=8.500, Mean=8.071, 3rd Qu=8.750, Max=9.500.

(2) Draw a Box plot for this data set

![Box plot](image)

**Note:** Left line should be extended up to 5

(3) Calculate the percentile corresponding to the value of 9

\[ P = \left( \frac{5}{7} \right) \times 100 = 71.43 \]. 9 is the 71.43th Percentile of the data set.

(6.0 pts (2.0 each))

**Problem 2:** MULTIPLE CHOICE

(1) Select the complement of the event: All 80 participants in a study are kidney donors.

A) At least one of the participants is a kidney donor.
B) Less than 40 of the participants are kidney donors.
C) None of the participants are kidney donors.
(2) Select the pair of events that are disjoint for a single trial.
   A) Randomly selecting an ophthalmologist; Randomly selecting a male doctor
   B) Randomly selecting a bird; Randomly selecting a hummingbird
   C) Randomly selecting someone taking Tylenol; Randomly selecting someone in a control group taking no medications
   D) Randomly selecting someone with type O blood; Randomly selecting someone with Rh positive blood

(2.0 pts (1.0 each))

Problem 3: In new data submitted to the FDA, Mentor, a manufacturer of silicone implants, claimed the rupture rate for cosmetic surgery, measured by MRI scans after four years, was .5%. If a group of four patients are randomly selected and scanned, what is the probability that there will be at least one patient with a ruptured implant?

\[ P(\text{there will be at least one patient with a ruptured implant}) = 1 - P(\text{none of the patients will have a rupture implant}) = 1 - 0.995^4 = 0.0198505 \] using the multiplication rule and the compliment of an event

Problem 4: The following data describes results from a clinical trial of a well known drug

<table>
<thead>
<tr>
<th></th>
<th>Treatment</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea</td>
<td>117</td>
<td>29</td>
</tr>
<tr>
<td>No Nausea</td>
<td>617</td>
<td>696</td>
</tr>
</tbody>
</table>

(1) Is this a prospective or retrospective study? Prospective since the data are collected during the study by looking at the effect on patients after the treatment

(2) Compute the \( P(\text{Nausea}|\text{Treatment}) \) and \( P(\text{Nausea}|\text{Placebo}) \)

\[ P(\text{Nausea}|\text{Treatment}) = \frac{117}{117 + 617} = 0.1594, \ P(\text{Nausea}|\text{Placebo}) = \frac{29}{29 + 696} = 0.04 \]

(3) Find the relative risk for nausea of those in the treatment group compared to those in the placebo group

\[ \frac{p_t}{p_c} = \frac{0.1594}{0.04} = 3.985 \]

(5.0 pts (1, 2, 2))