1. The histogram for data on the length of three bacterial strains is shown below. Lengths are given in microns. Below the histograms (but not necessarily directly below) are empirical cumulative distribution functions corresponding to these three histograms.

(a) Match the histograms to their respective empirical cumulative distribution functions.

(b) Explain how you matched wild1f to an empirical cumulative distribution function.
2. Manatees live along the Florida coast. Below are the data on powerboat registration (in thousands) and the number of manatees killed by boats in Florida from 1986 to 1990.

<table>
<thead>
<tr>
<th>powerboat registration</th>
<th>615</th>
<th>645</th>
<th>675</th>
<th>711</th>
<th>719</th>
</tr>
</thead>
<tbody>
<tr>
<td>manatee deaths</td>
<td>33</td>
<td>38</td>
<td>42</td>
<td>50</td>
<td>47</td>
</tr>
</tbody>
</table>

(a) Which of the two variables is the explanatory variable and which is the response?

(b) Give an appropriate scatterplot of the data.

(c) Find the mean of the powerboat registration (in thousands) and the number of manatees.

(d) Find the covariance of powerboat registration (in thousands) and the number of manatees.
(e) The variance for the manatee population is 46.5 and the variance for the powerboat registrations is 1976.5. Find the correlation for these two variables.

3. The Residence Life Recycling and Sustainability Program at the University of Arizona would like to increase the amount of recycling in the residence halls. In order to perform this, they pick two residence halls and provide an educational program. They then measure how much recycling has increased.

(a) Explain the problems that you see in the design.

(b) You have been hired as a consultant to the Residence Life Recycling and Sustainability Program. Explain how you can improve their design.
4. An urn has 8 green and 11 blue marbles. Draw 3.

(a) Give the probability that the first marble is green.

(b) Give the probability that all three marbles are green.

(c) Give the probability that at least one of the three marbles is blue.

(d) Find the probability that exactly one of the three marbles is blue.
5. Let $X$ be a continuous random variable with density function.

$$f_X(x) = \begin{cases} \frac{1}{2} + \frac{1}{4}x & -1 \leq x \leq 1, \\ 0 & \text{otherwise.} \end{cases}$$

(a) Sketch the density function.

(b) Find $P\{0 \leq X \leq \frac{1}{2}\}$ and indicate this probability on the graph in part (a).

(c) Find $EX^2$. 