MATH 134A Review: Sample Statistics

Facts to Know

A point estimate is the value of a statistic that estimates the value of a population parameter (e.g. proportion, mean, standard deviation).

- Let $x$ be the number of individuals in a sample with a sought-after characteristic, and let $n$ be the sample size. Then
  $$\frac{x}{n} =: \hat{p}$$
  is the point estimate for the population proportion.

- Let $x_1, \ldots, x_n$ be data collected from individuals within a sample; here $n$ is the sample size. Then
  $$\frac{x_1 + \cdots + x_n}{n} =: \bar{x}$$
  is the point estimate for the population mean. Also
  $$\frac{(x_1 - \bar{x})^2 + \cdots + (x_n - \bar{x})^2}{n - 1} =: s^2$$
  is the point estimate for the population variance.

Examples

1. A poll was conducted which sampled 1016 adults with a yes-or-no question. Of the 1016 adults surveyed, 558 said “yes.” Obtain a point estimate for the proportion of adults who will respond “no” to the surveyed question.
2. Some drivers report the miles per gallon of their vehicle to a particular government website. The following table shows data for 16 different owners of the 2011 Ford Focus automobile.

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<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>35.7</td>
<td>37.2</td>
<td>34.1</td>
<td>38.9</td>
</tr>
<tr>
<td>32.0</td>
<td>41.3</td>
<td>32.5</td>
<td>37.1</td>
</tr>
<tr>
<td>37.3</td>
<td>38.8</td>
<td>38.2</td>
<td>39.6</td>
</tr>
<tr>
<td>32.2</td>
<td>40.9</td>
<td>37.0</td>
<td>36.0</td>
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</tbody>
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Source: www.fueleconomy.gov

Obtain a point estimate for the mean and variance miles per gallon of a 2011 Ford Focus. You are allowed to write an expression that simplifies to get the desired answer; that is to say, do not simplify.

\[
\bar{x} = \frac{x_1 + \cdots + x_n}{n}
\]

\[
\frac{(x_1 - \bar{x})^2 + \cdots + (x_n - \bar{x})^2}{n - 1}
\]