1. \( E[X] = 3.7 \text{ miles}, \ V[X] = 2.61 \)

2. \( \bar{\mu} = 3.65 \)

3. \( \text{median} = 172, \ \bar{x} = 169.4, \ s^2 = 52.30 \)

4. \( p = 0.6, \ n = 10 \) thus Binomial distribution; \( P(X \geq 5) = 1 - P(X \leq 4) = \)

\[
> \ 1 - \text{pnorm}(4, 10, .6)
\]

[1] 0.8337614

5.

The test grades for a certain class were entered into a Minitab worksheet, and then Descriptive Statistics were requested. The results were:

<table>
<thead>
<tr>
<th>Grades</th>
<th>N</th>
<th>MEAN</th>
<th>MEDIAN</th>
<th>TRMEAN</th>
<th>STDEV</th>
<th>SEMEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIN</td>
<td>40</td>
<td>59.00</td>
<td>65.00</td>
<td>65.00</td>
<td>8.00</td>
<td>84.00</td>
</tr>
</tbody>
</table>

You happened to see, on a scrap of paper, that the lowest grades were 35, 57, 59, 60, … but you don’t know what the other individual grades are. Nevertheless, a knowledgeable user of statistics can tell a lot about the data set simply by studying the set of descriptive statistics above.

a. Write a brief description of what the results in the box tell you about the distribution of grades. Be sure to address:

i. The general shape of the distribution

ii. Unusual features, including possible outliers

iii. The middle 50% of the data

iv. Any significance in the difference between the mean and the median

b. Construct a boxplot for the test grades.

6. 0.33

7.

a. 0.1
b. 0.1

c. yes \( P(H \mid I) = P(H) \)
8.  
   a. 0.027  
   b. 0.778  

9.  
   a. 0.82  
   b. 0.16  

10. 0.5  

11.  
   a. \( P(X = 4) = 0.15 \)  
   b. \( P(1 \leq X < 3) = 0.45 \)  
   c. 2.25  
   d. 1.178  
   e. 3  

12.  
   a. \( E[Y] = 57 \)  
   b. \( V[Y] = 17.64 \)  
   c. 4.2  
   d. 17.64  

13.  
   a. 192  
   b. 108  
   c. 0.4375 or 7/16  

14.  
   a. \( P(A|B) = \frac{2}{3} \)  
   b. No
15.
   a. 0.044
   b. 0.3409

16. 0.9066543

17. 
   \[
   \frac{5}{365} = 0.0137
   \]

18. The following is what is done in R studio
   
   ```r
   > x=c(77, 50, 71, 72, 81, 94, 96, 99, 67)
   > y=c(82, 66, 78, 34, 47, 85, 99, 99, 68)
   > plot(x, y)
   > cor(x, y)
   [1] 0.5610055
   > grades.lm=lm(y~x)
   > summary(grades.lm)
   Call:
   lm(formula = y ~ x)
   Residuals:
   Min      1Q  Median      3Q     Max
   -34.017  -0.114   10.001  10.761  15.081
   Coefficients:
   Estimate Std. Error t value Pr(>|t|)
   (Intercept)  12.0623    34.6612   0.348    0.738
   x             0.7771     0.4334   1.793    0.116
   Residual standard error: 19.47 on 7 degrees of freedom
   Multiple R-squared:  0.3147, Adjusted R-squared:  0.2168
   F-statistic: 3.215 on 1 and 7 DF,  p-value: 0.1161
   ```
a) Strength: Moderate, Direction: positive, Form: linear
b) Correlation = r = 0.561 there is a positive moderate relationship between the grades on the first exam (x) and the grades on the final exam (y).
c) LSLR: \( \hat{y} = 12.0623 + 0.7771x \)
d) \( X = 85; \) predicted final exam score = 78.1158
e) Coefficient of determination: \( R^2 = 0.3147 \), this means that 31.47% of the variation in the final exam scores can be explained by the LSLR. This low of a \( R^2 \) implies that the first exam score may not be the best (or only thing) to predict final exam score.

19. This is binomial with n = 15 and p = 0.05
a) \( P(X = 5) = 0.00056 \)
b) This is a low probability.
c) \( E(X) = 15 \times 0.05 = 0.75 \) (which also confirms that having 5 defective may be too many defective).