1.- Find the mean and standard deviation of the following grouped data.

<table>
<thead>
<tr>
<th>Class limits</th>
<th>$F$</th>
<th>MP</th>
<th>$F \cdot MP$</th>
<th>$F \cdot MP^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 5</td>
<td>5</td>
<td>2.5</td>
<td>12.5</td>
<td>31.25</td>
</tr>
<tr>
<td>6 - 11</td>
<td>4</td>
<td>8.5</td>
<td>34.0</td>
<td>289</td>
</tr>
<tr>
<td>12 - 17</td>
<td>3</td>
<td>14.5</td>
<td>43.5</td>
<td>630.75</td>
</tr>
<tr>
<td>18 - 23</td>
<td>2</td>
<td>20.5</td>
<td>41</td>
<td>840.5</td>
</tr>
</tbody>
</table>

\[ \overline{X}_{gd} = \frac{\sum F \cdot MP}{\sum F} = \frac{131}{14} = 9.35 \]

\[ S^2_{gd} = \frac{1791.5 - (131)^2/14}{13} = 43.52 \]

\[ S_{gd} = \sqrt{43.52} \approx 6.6 \]

2.- Consider the following data set: Monthly (in thousands) payment of employees at company ABC. Find

5, 5, 6, 6, 7, 8, 8, 8, 9, 12, 12, 16, 18, 22, 24, 26, 27, 28, 40, 42, 50

\( n = 21 \)

\( \sqrt{19th} \)

(a) \( P_{0.37} \)

\[ \text{step1:} \frac{(21)(0.37)}{100} = 18.27 \]

\[ \text{step2:} \ L(P_{0.37}) = 19 \]

(b) \( \overline{X} = 18.05 \)

(c) \( IQR = Q_3 - Q_1 \)

\[ Q_3 = 26 \]

\[ Q_1 = 8 \]

\[ Q_3 - Q_1 = 26 - 8 = 18 \]

(d) Outliers

\( UB = 26 + 1.5(18) = 53 \)

\( LB = 8 - 1.5(18) = -19 \)

\[ -19 \quad 53 \]

(e) The Five Number Summary.

\( L = 5, \ Q_1 = 8, \ Q_2 = 12, \ Q_3 = 26, \ H = 50 \)

(f) Draw a box plot
3. The XYZ association has 100 members. 25 of the members are Mexican, 32 of the members are Catholic and 8 of the members are both Mexican and Catholic. If you randomly select one person from this association what is the probability that

(a) The person is Mexican or Catholic

\[ P(M \cup C) = P(M) + P(C) - P(M \cap C) = \frac{25}{100} + \frac{32}{100} - \frac{8}{100} = \frac{49}{100} \]

(b) The person is Mexican but not Catholic

\[ P(M \cap \overline{C}) = \frac{17}{100} \]

(c) The person is neither Mexican or Catholic

\[ P(\overline{M} \cup \overline{C}) = \frac{51}{100} \]

(d) If the person selected is Mexican that she/he is not Catholic

\[ P(\overline{C} | M) = \frac{P(\overline{C} \cap M)}{P(M)} = \frac{17/100}{25/100} = \frac{17}{25} \]

(e) Are the events Mexican and Catholic independent? Explain

\[ P(M \cap C) = P(M)P(C) \]

\[ \frac{8}{100} = \frac{25}{100} \cdot \frac{32}{100} = \frac{8}{100} \]

4. Solve the following probabilities.

<table>
<thead>
<tr>
<th></th>
<th>Republican</th>
<th>Democrat</th>
<th>Green Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>50</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>College</td>
<td>30</td>
<td>20</td>
<td>50</td>
</tr>
</tbody>
</table>

(a) What is the probability that a randomly selected person is Not Republican?

\[ P(\overline{R}) = \frac{170}{250} \]

(b) What is the probability that a randomly selected person is a Democrat or a College Student?

\[ P(D \cup C) = P(D) + P(C) - P(D \cap C) = \frac{80}{250} + \frac{100}{250} - \frac{20}{250} = \frac{160}{250} \]
(c) If the person selected was a Republican, what is the probability that he/she was a College Student?

\[ P(C \mid R) = \frac{P(C \cap R)}{P(R)} = \frac{30}{80/250} = \frac{30}{80} \]

(d) Are Green Party and College independent events?

\[ P(G \cap C) = P(G)P(C) \]

\[ \frac{50}{250} \neq \frac{90}{250} \cdot \frac{100}{250} \]

\[ G \nleftrightarrow C \]

5.- According to a local survey 55% of Angelinos pray every day. If you randomly select 4 Angelinos:

(a) What is the probability that all pray everyday?

\[ P(1^{st} \cap 2^{nd} \cap 3^{rd} \cap 4^{th}) = P(1^{st})P(2^{nd})P(3^{rd})P(4^{th}) \]

\[ = (0.55)(0.55)(0.55)(0.55) \]

\[ = 0.0915 \]

(b) What is the probability that none of them pray?

\[ P(\text{none}) = (0.45)(0.45)(0.45)(0.45) \]

\[ = 0.0410 \]

(c) What is the probability that at least one prays everyday?

\[ P(\text{At least one}) = 1 - P(\text{none}) \]

\[ = 1 - 0.0410 \]

\[ = 0.959 \]

6.- Suppose that 45% of the population is male and that 12% are smokers. If 8% of females are smokers, what is the probability that

(a) A randomly selected person is a smoker?

\[ P(S) = (0.45)(0.12) + (0.55)(0.08) \]

\[ = 0.098 \]

\[ 0.45 \]

\[ 0.55 \]

\[ 0.12 \]

\[ 0.08 \]

\[ 0.08 \]

\[ 0.92 \]

\[ S \]

\[ NS \]
(b) A randomly selected person is NOT a smoker?

\[ P(\text{NS}) = 1 - P(S) \]
\[ = 1 - 0.098 \]
\[ = 0.902 \]

(c) If the person selected was a smoker, that the person was male?

\[ P(M|S) = \frac{P(M \cap S)}{P(S)} = \frac{(0.45)(0.12)}{0.098} \approx 0.5510 \]

7.- The simple Passcode for an iPhone consists of four digits (which can be repeated).

(a) How many different simple Passcodes are there for any iPhone?

\[ \begin{array}{cccc}
  \times & \times & \times & \times \\
10 & 10 & 10 & 10 \\
\end{array} = 10000 \]

(b) If your boyfriend has an iPhone with a Passcode on it, what is the probability that you will guess the correct Passcode in the first try?

\[ P(\text{Correct on 1st Attempt}) = \frac{1}{10000} \]

(c) Your boyfriend has set the Passcode so that after three failed attempts the iPhone locks. What is the probability of this happening?

\[ P(\text{phone will lock}) = P(F_1 \cap F_2 \cap F_3) \]
\[ = \frac{9999}{10000} \cdot \frac{9998}{9999} \cdot \frac{9997}{9998} = \frac{9997}{10000} \]

8.- A statistics class has 8 American students, 10 Asian Students, 7 African Students and 5 European students. If a committee of five people will be formed from this class, what is the probability that the members will be

(a) Two American and two African and one European

\[ P(2 \text{ Amer, 2 Afr, 1 Eu}) = \frac{8C_2 \cdot 7C_2 \cdot 5C_1 \cdot 10C_0}{30C_5} \]
(b) Four American
\[
\Pr(4 \text{ American}) = \frac{8 \cdot 22 \cdot 21}{30 \cdot 29}
\]

(c) At least one European
\[
\Pr(\text{at least one Eur}) = 1 - \frac{5 \cdot 25 \cdot 24}{30 \cdot 29}
\]
\[
\Pr(\text{no Eur}) = \frac{5 \cdot 25 \cdot 24}{30 \cdot 29}
\]
\[
\overline{CV} = \frac{S}{X}
\]

9. True/False section.

(a) If \(x < 0\) then \(CV > 0\). \quad \boxed{False}

(b) If A and B are independent then \(P(A \cap B) = 0\). \quad \boxed{False}

(c) The median and \(Q_2\) are the same. \quad \boxed{True}

(d) If A and B are mutually exclusive then \(P(A \cap B) = 1\) \quad \boxed{False}

(e) If \(P(\overline{A}) = 0.7\), then \(P(A) = \frac{1}{2}\). \quad \boxed{False}

(f) The median and the midrange could be the same. \quad \boxed{True}

(g) If A and B are independent then \(P(A \mid B) = P(A)\) \quad \boxed{True}

(h) For any two events \(P(A \cap B) \geq P(A)\). \quad \boxed{False}

(i) IQR = \(Q_3 - 1.5Q_1\) \quad \boxed{False}

(j) If A and B are independent then \(P(A \cup B) = P(A) + P(B) - P(A)P(B)\) \quad \boxed{True

\[P(A \mid B) = \frac{P(A \cap \overline{B})}{P(B)}\]

\[= \frac{P(A)P(B)}{P(B)}\]