1)

a) IV: exists or not
   DV: problem-solving test scores

b) IV: nominal scale (there is a program or not)
   DV: interval scale (times 0 is not absolute zero)

c) Ho: there is no improvement on the problem-solving test scores after the training program.

d) \[ \alpha = 0.01, \quad z = -2.58 \]

\[ z = \frac{34.80 - 80}{5/2} = 2.4 \]

Do not fall in the critical region

reject Ho. 

so, there is no effect of the program.

2)

\[ \frac{dF(x)}{dx} = \begin{cases} 0 & x < 0 \\ 2/6 & 0 \leq x \leq 3 \\ 0 & x > 3 \end{cases} \]

\[ P_r(x > 2) = 1 - P_r(x \leq 2) \]
\[ = 1 - \int_0^2 \frac{2}{3} x \, dx \]
\[ = \frac{5}{18} \]

--1--
(3) \[ P_r(L) = P_r(A) \cdot P_r(L|A) + P_r(B) \cdot P_r(L|B) \]
\[ = \frac{1}{2} \cdot \frac{60}{100} + \frac{1}{2} \cdot \frac{10}{30} = \frac{7}{15} \]

(4) \[ P_r(A \cap B) = P_r(A) - P_r(A \cap B) \]
\[ = P_r(A) - P_r(A) \cdot P_r(B) \]
\[ = P_r(A) \cdot (1 - P_r(B)) \]
\[ P_r(A \cap B) = P_r(A) \cdot P_r(B) \]
\[ \text{by def.} \quad \text{and} \quad A \text{ and } B \text{ are independent.} \]

(5) a) For example: the probability of obtaining a head when a coin is tossed is considered to be \( \frac{1}{2} \) because the relative frequency of heads should be approximately \( \frac{1}{2} \) when the coin is tossed a large number of times under similar conditions. In other words, it is assumed that the proportion of tosses on which a head is obtained would be approximately \( \frac{1}{2} \).

b) Activity: Class size = 32
Divide class into four groups
Each group was assigned with eight columns.
Each student tosses 10 coins.
1. For each student: proportion of being head
2. For each group:
3. For the class:
   (can miss the same characteristic)
a) \[ x \mid f \]
\[ \begin{array}{c|c}
8 & 2 \\
7 & 3 \\
6 & 5 \\
5 & 6 \\
4 & 2 \\
3 & 2 \\
2 & 1 \\
\end{array} \]

b) \[ \overline{x} = 5.4 \]
\[ \text{Var}(x) = \frac{\sum (x - \overline{x})^2}{n} \]
\[ 2 = \frac{7 - 5.4}{0.8} \]

From table, \[ \text{Var}(x) = 0.228 \]

\[ \sum (x - \overline{x})^2 = 5.8 \]

\[ \text{Var}(x) = \frac{5.8}{10} = 0.234 \]

\[ \sigma_x = \frac{0.8}{2} = 0.4 \]

c) \[ P_r(-0.68 < Z < 0.68) \]

\[ P_r(z > 0.68) = 0.5 \]

\[ P_r(z < 0.68) = 0.5 \]

\[ P_r(\text{semi-integral}) = P_r(\{1\}) \]