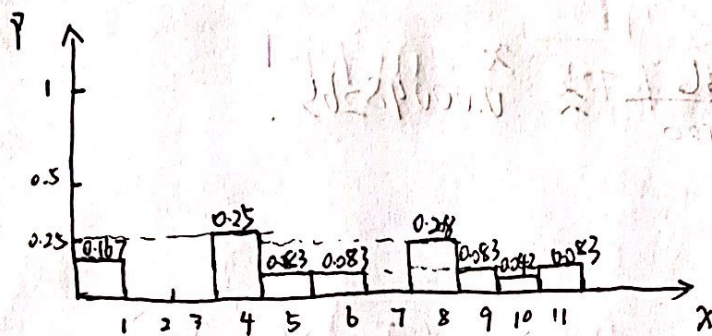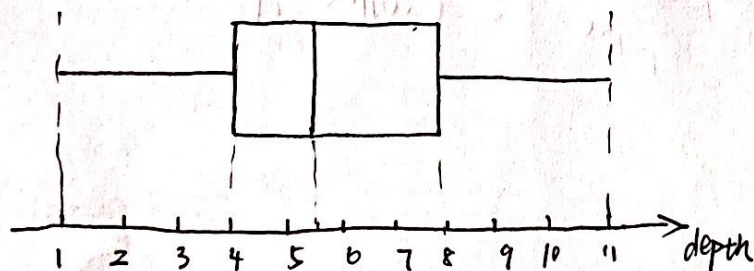1.

a. $P_{(1)} = \frac{4}{24} = 0.167$ $P_{(4)} = \frac{6}{24} = 0.25$ $P_{(5)} = \frac{2}{24} = 0.083$

$P_{(6)} = \frac{2}{24} = 0.083$ $P_{(8)} = \frac{5}{24} = 0.208$ $P_{(9)} = \frac{2}{24} = 0.083$

$P_{(10)} = \frac{1}{24} = 0.042$ $P_{(11)} = \frac{2}{24} = 0.083$

b. The minimum = 1   lower forth = 4

The median = 5.5

The maximum = 11   Upper forth = 8.

2. $\bar{X} = \frac{29+27+30+31+21+26+30+35+38+33}{10} = 30$

$S^2 = \frac{\sum(x_i-\bar{X})^2}{n-1} = \frac{(29-30)^2+(27-30)^2+(30-30)^2+(31-30)^2+(21-30)^2+(26-30)^2+(30-30)^2+(35-30)^2+(38-30)^2+(33-30)^2}{9}$

$= \frac{206}{9} \approx 22.889.$

$S = \sqrt{S^2} = 4.784.$

The sample mean: each car gets an average of 30 miles per gallon.

The standard deviation ~~for the~~ means: The gas milge's dispersion degree is 4.784.
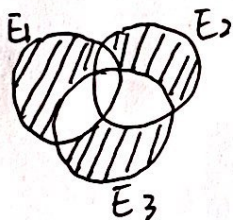
There is a large range up or down from the sample mean.

1

3. a. $P = \dfrac{C_4^3 \times C_{48}^1}{C_{52}^4} = \dfrac{4 \times 48}{\dfrac{52 \times 51 \times 50 \times 49}{4 \times 3 \times 2 \times 1}} = \dfrac{192}{270725} \approx 0.00070921$
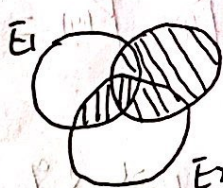
b. $P = \dfrac{C_{12}^4}{C_{52}^4} = \dfrac{\dfrac{12 \times 11 \times 10 \times 9}{4 \times 3 \times 2 \times 1}}{C_{52}^4} = \dfrac{495}{270725} \approx 0.00182842$

c. $P = \dfrac{C_4^1 C_4^1 C_4^1 \times C_{49}^1}{C_{52}^4} = \dfrac{3136}{270725} \approx 0.01158371$

4. a.

$$(E_1 \wedge E_2' \wedge E_3') \cup (E_1' \wedge E_2 \wedge E_3') \cup (E_1' \wedge E_2' \wedge E_3)$$

b.

$$(E_1 \wedge E_3) \cup E_2$$

5. $P_{(death)} = 1 - 90\% = 10\%$

$P_{(death)} = 5\% \times 10\% + 90\% \times P$

$P = \dfrac{0.95}{0.9} \approx 10.556\%$

6. (a). $F_{(1)} = P(x \leq 1) = P(x = 1) = P_{(1)} = 0.12$

$F_{(2)} = P(x \leq 2) = P(x = 1 \text{ or } 2) = P_{(1)} + P_{(2)} = 0.20$

$F_{(4)} = P(x \leq 4) = P(x = 1 \text{ or } 2 \text{ or } 4) = P_{(1)} + P_{(2)} + P_{(4)} = 0.50$

$F_{(8)} = P(x \leq 8) = P(x = 1 \text{ or } 2 \text{ or } 4 \text{ or } 8) = P_{(1)} + P_{(2)} + P_{(4)} + P_{(8)} = 0.85$

$F_{(16)} = P(x \leq 16) = P(x = 1 \text{ or } 2 \text{ or } 4 \text{ or } 8 \text{ or } 16) = P_{(1)} + P_{(2)} + P_{(4)} + P_{(8)} + P_{(16)} = 1$

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b. $P(2 \leqslant x \leqslant 8) = P(x \leqslant 8) - P(x \leqslant 1) = 0.85 - 0.12 = 0.73$

7.

y	1	3	9	19
P(y)	0.20	0.15	0.35	0.30

$F_{(1)} = P(Y \leqslant 1) = P(Y=1) = P_{(1)} = 0.20$

$F_{(3)} = P(Y \leqslant 3) = P(Y=1 \text{ or } 3) = P_{(1)} + P_{(3)} = 0.35$

$F_{(9)} = P(Y \leqslant 9) = P(Y=1 \text{ or } 3 \text{ or } 9) = P_{(1)} + P_{(3)} + P_{(9)} = 0.7$

$F_{(19)} = P(Y \leqslant 19) = P(Y=1 \text{ or } 3 \text{ or } 9 \text{ or } 19) = P_{(1)} + P_{(3)} + P_{(9)} + P_{(19)} = 1$

$E(Y) = \Sigma Y \cdot P_{(y)} = 0.20 \times 1 + 0.15 \times 3 + 0.35 \times 9 + 0.30 \times 19$
$= 9.5.$

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