[illegible] ITITSB22029

(1) $P(E_1) + P(E_2) + P(E_3) + P(E_4) = 0.1 + 0.15 + 0.4 + 0.2 = 0.85$

which is not equal to 1, so these probabilities are not valid

(2) a) $P(x) = \frac{858}{858+228} = 0.79$

b) Yes, because the value 0.79 is higher than 0.75 and 0.78.

c) $P(NE) = \frac{148}{148+52} = 0.74$; $P(S) = \frac{296}{296+74} = 0.8$

$P(MW) = \frac{162}{162+54} = 0.75$; $P(W) = \frac{252}{252+48} = 0.84$ (highest)

=> West has the highest seat belt usage.

d) $\%NE = \frac{148+52}{200+216+370+300} = \frac{200}{1086} \times 100\% = 18.42\%$

$\%MW = \frac{162+54}{1086} = \frac{216}{1086} \times 100\% = 19.89\%$

$\%S = \frac{296+74}{1086} = \frac{370}{1086} \times 100\% = 34.07\%$ (Most)

$\%W = \frac{252+48}{1086} = \frac{300}{1086} \times 100\% = 27.62\%$ (second most)

=> South had the most drivers selected and West had the second most drivers selected.

e) $0.74 \times 0.25 + 0.75 \times 0.25 + 0.8 \times 0.25 + 0.84 \times 0.25 = 0.7825 < 0.7$

=> The probabilities for each region are not the same

(3) $S = \{\$100, \$25, \$10\}$

$P(\$100 \text{ envelope}) = \frac{75}{500} = 0.15$

$P(\$25 \text{ envelope}) = \frac{150}{500} = 0.3$

$P(\$10 \text{ envelope}) = \frac{275}{500} = 0.55$

$P(\text{first envelope contain less than } \$100) = \frac{150+275}{500} = \frac{425}{500} = 0.85$

④

a) $C(9,4) = 84$ ways

• choose dictionary, therefore, the number of way to choose 1 out of 1 dictionary:

$C(1,1) = 1$

• the number of ways to choose 2 out of 8 non-dictionaries is:

$C(8,2) = 28$

$\Rightarrow P = \frac{28 \times 1}{84} = 0.333$

b) The number of ways to choose 2 out of 5 novels:

$C(5,2) = 10$

The number of ways to choose 1 out of 3 books poems:

$C(3,1) = 3$

$\Rightarrow P = \frac{3 \times 10}{84} = 0.3571$

Slides: ①

$P(10,4) = \frac{10!}{(10-4)!} = 5040$

② a) $2^{10} = 1024$

b) $C(10,4) = 210$

③

a) $C(25,15) = 53130$

b) $C(15,5) = 3003$

c) $C(15,3) \cdot C(10,2) = 20475$

d) $C(15,4) \cdot C(11,4) + C(15,4) \cdot C(10,1) = 16653$

$C(15,5)$

(2) $P_1 = P_2$

$P_3 = 3P_1$

$P_4 = 5P_1$

a) $P_1 + P_2 + P_3 + P_4 = P(S) = 1$

$= P_1 + P_1 + 3P_1 + 5P_1 = 1$

$= 10P_1 = 1 \Rightarrow P_1 = \frac{1}{10}$

$\Rightarrow P_2 = \frac{1}{10}$ | $\Rightarrow P_3 = 3 \times \frac{1}{10} = \frac{3}{10}$ | $\Rightarrow P_4 = \frac{5}{10}$

b) $P_1 + P_2 = \frac{1}{10} + \frac{1}{10} = \frac{2}{10} = \frac{1}{5}$

c) $P_2 + P_4 = \frac{1}{10} + \frac{5}{10} = \frac{6}{10}$

d) $P(S) - P_1 = 1 - \frac{1}{10} = \frac{9}{10}$