

Solutions to Pre-Class Problems for 29 Jan

1.5

$$\begin{aligned}\textcircled{2} \text{ a) } P(G) &= P(A)P(G|A) + P(B)P(G|B) \\ &= (0.4)(0.85) + (0.6)(0.75) \\ &= \boxed{0.79}\end{aligned}$$

$$\text{b) } P(A|G) = \frac{P(A \cap G)}{P(G)} \quad \text{Bayes's Thm.} = \frac{(0.4)(0.85)}{0.79} = \boxed{0.4304}$$

$\textcircled{4}$ A = accident

$$\begin{aligned}P(16-25|A) &= \frac{P(16-25 \cap A)}{P(A)} \\ &= \frac{(0.05)(0.10)}{(0.05)(0.10) + (0.02)(0.55) + (0.03)(0.2) + (0.04)(0.15)} \\ &\quad \begin{array}{c} \uparrow \quad \quad \uparrow \\ \text{prob. of} \quad \text{proportion} \\ \text{accident} \quad \text{of drivers} \end{array} \quad \text{add up all groups} \\ &= \boxed{0.179}\end{aligned}$$

$$\begin{aligned}\textcircled{6} \quad P(\text{standard} | \text{death}) &= \frac{P(\text{standard} \cap \text{death})}{P(\text{death})} \\ &= \frac{(0.06)(0.01)}{(.01)(.06) + (.008)(.3) + (.007)(.1)} = \frac{.0006}{.0091} = \boxed{0.659}\end{aligned}$$

$$P(\text{preferred} | \text{death}) = \frac{(0.008)(0.3)}{0.091} = \boxed{0.264}$$

$$P(\text{ultrapreferred} | \text{death}) = \frac{(0.007)(0.1)}{0.091} = \boxed{0.077}$$

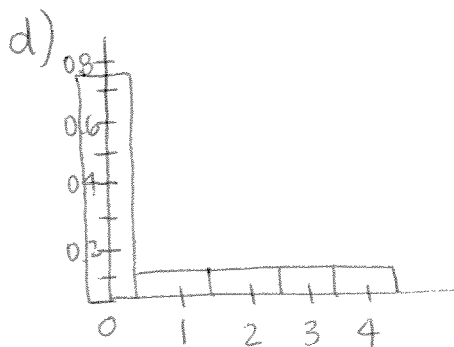
2.1

② a) $f(x) = \begin{cases} \frac{9}{13}, & x=0 \\ \frac{1}{13}, & x=1,2,3,4 \end{cases}$

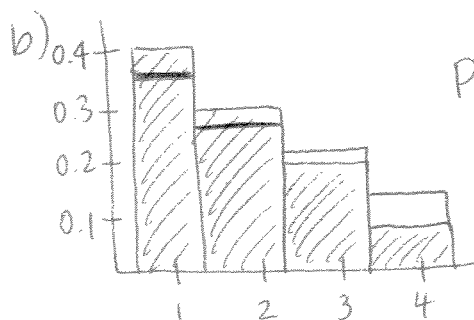
b) $P(X \geq 1) = P(1) + P(2) + P(3) + P(4)$
 $= \frac{1}{13} + \frac{1}{13} + \frac{1}{13} + \frac{1}{13} = \boxed{\frac{4}{13}}$

c) $\mu = \sum x f(x)$
 $= 0\left(\frac{9}{13}\right) + 1\left(\frac{1}{13}\right) + 2\left(\frac{1}{13}\right) + 3\left(\frac{1}{13}\right) + 4\left(\frac{1}{13}\right) = \boxed{\frac{10}{13}}$

$\sigma^2 = \left(\sum x^2 f(x)\right) - \mu^2$
 $= 0^2\left(\frac{9}{13}\right) + 1^2\left(\frac{1}{13}\right) + 2^2\left(\frac{1}{13}\right) + 3^2\left(\frac{1}{13}\right) + 4^2\left(\frac{1}{13}\right) - \left(\frac{10}{13}\right)^2 = \boxed{\frac{290}{169}}$



⑥ a) 1: 0.38 2: 0.27 3: 0.21 4: 0.14



Probability Histogram Shaded

c) $\mu = 2$ $\bar{x} = 2.11$ $\sigma^2 = 1$ $s^2 = 1.149$

$\mu + \sigma^2$ from pmf
 $\bar{x} + s^2$ from data

* $s^2 = \left(\frac{n}{n-1}\right) \sigma^2$

σ^2 is ~~sample~~ variance