

THE HONG KONG POLYTECHNIC UNIVERSITY
HONG KONG COMMUNITY COLLEGE

Subject Title : Information Processing and
Quantitative Methods

Subject Code : CCN1039

Session : Semester Two, 2015/16

Numerical Answers

Question B1

- (b) The sample is the 100 selected HKCC students

Question B2

- (a) $P(\text{Female and like CCN1039}) = \frac{42}{140} = 0.3$
(b) $P(\text{Female or like CCN1039}) = \frac{35+42+42}{140} = 0.85$
(c) $P(\text{Female and like CCN1039}) = \frac{42}{77} = \frac{6}{11}$ (or 0.5455)

Question B3

- (a) $E(X) = 0 \times 0.8 + 50 \times 0.15 + 100 \times 0.04 + 500 \times 0.01$
 $= 16.5$
 $SD(X) = \sqrt{0^2 \times 0.8 + 50^2 \times 0.15 + 100^2 \times 0.04 + 500^2 \times 0.01 - 16.5^2}$
 $= 54.80$
(b) Since $E(X) = 16.5 < 20$, it is not a fair game.

Question B4

- (a) $P(-1.33 < Z < 0.72)$
 $= 0.2642 + 0.4082$
 $= 0.6724$
(b) $P(Z < k) = 0.9474$
 $P(0 < Z < k) = 0.4474$
 $k = 1.62$

Question B5

- (a) Recommended decision : d_3
Payoff value = 16 or (\$160,000)
(b) Recommended decision : d_2
Payoff value = 9 or (\$90,000)
(c) Recommended decision : d_2
Maximum regret value = 4 or (\$40,000)

Question C1

- (a) Sample mean = $\frac{23+25+\dots+65}{25} = 46.2$
Mode = 37
Median = 46
- (b) Range = $65 - 23 = 42$
Interquartile range = $57 - 37 = 20$
Standard deviation = $\sqrt{\frac{(23-46.2)^2 + (25-46.2)^2 + \dots + (65-46.2)^2}{24}} = 12.339$
- (c) C.V. = $\frac{12.339}{46.2} \times 100\%$
= 26.708%
- (d) $i = 25 \times 60\% = 15$
60th percentile = $\frac{48+52}{2} = 50$
- (e) Lower limit = $37 - 1.5 \times 20 = 7$
Upper limit = $57 + 1.5 \times 20 = 87$
No there is no outlier as all the data lie within 7 and 87.

Question C2

- (a) EV(node 12) = 7.80
EV(node 13) = 12.2
EV(node 14) = 14.2
For node 5, Recommended decision is d_3 .
Expected value = 14.2
- (b) EV(node 6) = 7.94
EV(node 7) = 13.46
EV(node 8) = 18.26
EV(node 9) = 7.35
EV(node 10) = 8.15
EV(node 11) = 1.15
- (c) Favourable $\rightarrow d_3$ EV(node 3) = 18.26,
Recommended decision is d_3 .
The corresponding expected value is 18.26
- (d) Unfavourable $\rightarrow d_2$ EV(node 4) = 8.15
Recommended decision is d_2 .
The corresponding expected value is 8.15
- (e) EV(node 2) = $0.77 \times 18.26 + 0.23 \times 8.15 = 15.93$

Question C3

$$\begin{aligned} \text{(a)(i)} \quad & P(16000 \leq X \leq 17800) \\ & = P(0 \leq Z \leq 1) \\ & = 0.3413 \end{aligned}$$

$$\begin{aligned} \text{(a)(ii)} \quad & P(X \leq 14000) \\ & = P(Z \leq -1.11) \\ & = 0.5 - 0.3665 \\ & = 0.1335 \end{aligned}$$

$$\begin{aligned} \text{(a)(iii)} \quad & P(X \geq k) = 10\% \\ & 1.28 = \frac{k-16000}{1800} \\ & k = 18304 \end{aligned}$$

$$\begin{aligned} \text{(b)(i)} \quad & P(\bar{X} \geq 16600) \\ & = P(Z \geq 1.67) \\ & = 0.5 - 0.4525 \\ & = 0.0475 \end{aligned}$$

$$\begin{aligned} \text{(b)(ii)} \quad & P(\bar{X} \leq M) = 20\% \\ & -0.84 = \frac{M-16000}{(1800/\sqrt{25})} \\ & M = 15697.6 = 15698 \text{ (correct to the nearest integer.)} \end{aligned}$$