Victoria University of Bangladesh
Department of CSE
Program:- BSc in CSIT
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Course code:- STA 235

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Ans to the Q no-(2)

Major	Happy	Unhappy	Total
Psychology	43	45	88
Communication	33	57	90
History	25	27	52
Total	101	129	230

a) Unhappy with the choice of major:-

$$P(U) = \frac{129}{230}$$

$$= 0.56086$$

b) The student is unhappy given that the student has a communication major:-

$$P(U/C) = \frac{P(U \cap C)}{P(C)} = \frac{57/230}{90/230}$$

$$= 0.633$$

c) The student have a history major given that the student is happy:-

$$P(\bar{A}/H) = \frac{P(\bar{A}/H)}{P(H)} = \frac{76/230}{0.752475}$$

d) A psychology major and unhappy with that major:-

$$P(P \cap U) = \frac{45}{230}$$

$$= 0.1956 \text{ (Ans)}$$

Ans to the Q, no-(3)

Given,

$P = 82\% = 0.82$ | $n = 5$

We know,

$$P(X) = {}^{n}C_{x} p^{x} (1-p)^{n-x}$$

i) $P(x=5) = {}^{5}C_{5} (0.82)^{5} (1-0.82)^{5}$

$= 0.37073$

ii) $P(x>4) = P(x=4) + P(x=5)$

$= {}^{5}C_{4} (0.82)^{4} (1-0.82)^{5-4} + 0.37073$

$= 0.4069909 + 0.37073$

$= 0.77763995$

iii) $P(x=0) = {}^{5}C_{0} (0.82)^{0} (1-0.82)^{5-0}$

$= 0.0001889$

iv) mean,

$\mu = np$

$= 5 \times 0.82$

$= 4.1$

Variance,

$\sigma^2 = np(1-p)$

$= 5 \times 0.82 \times (1-0.82)$

$= 0.738$ Ans.

Ans to the Q no - (4)

Given,

$\lambda = 5.8$

We know, $p(x) = \frac{e^{-\lambda} \lambda^x}{x!}$

a) Now, $p(x \leq 3) = p(x=0) + p(x=1) + p(x=2) + p(x=3)$

$= \frac{e^{-5.8}(5.8)^0}{0!} + \frac{e^{-5.8}(5.8)^1}{1!} + \frac{e^{-5.8}(5.8)^2}{2!} + \frac{e^{-5.8}(5.8)^3}{3!}$

$= 0.1699628$ Ans.

b) Now,

$P(x \geq 7) = 1 - P(x < 7)$

$= 1 - \{P(x \leq 3) + P(x=4) + P(x=5) + P(x=6)\}$

$= 1 - \{0.1699628 + \frac{e^{-5.8}(5.8)^4}{4!} + \frac{e^{-5.8}(5.8)^5}{5!} + \frac{e^{-5.8}(5.8)^6}{6!}\}$

$= 1 - \{0.1699628 + 0.46842\}$

$= 1 - 0.6383910$

$= 0.36160$ (Ans.

Ans to the Q no - (5)

Given mean, $\mu = 48$

S.D, $\sigma = 7$

Now, $z = \frac{x - \mu}{\sigma}$

$= \frac{55 - 48}{7}$

$= 1$

Here, $x = 55$.

Now, $P(x<55) = P(z<1)$

$= 0.8413$

b) Again,

$$z = \frac{95-48}{7} = \frac{47}{7}$$

$$= 6.71428$$

Now,

$P(x>95) = P(z>6.714)$

$= 1 - P(z<6.714)$

$= 1 - 1$

$= 0$

c) Between 75 and 90

Now, $z_1 = \frac{75-48}{7} = 3.857$ and $z_2 = \frac{90-48}{7} = 6$

Now, $P(75<x<90)$

$= P(3.857 < z < 6)$

$= P(z<6) - P(z<3.857)$

$= 1 - 0.99994$

$= 0.00006$

Ans.