Final Examination, Summer -2022

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STA-235 - Statistics

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Ans. to the Q.no-1

1@

$$\text{mean } \bar{x} = \frac{\Sigma x}{n} = \frac{74.26}{15} = 4.95$$

median = 3.18

Mode = using emperial formula -

$$3 \times \text{median} - 2 \times \text{mean}$$

$$= 3 \times 3.18 - 2 \times 4.95$$

$$= -0.36$$

$$\therefore SK = \frac{3(\text{mean} - \text{median})}{S}$$

$$= \frac{3(4.95 - 3.18)}{5.22}$$

$$= 1.017$$

Here,

$$S = \sqrt{\frac{\Sigma (x-7)^2}{n-1}}$$

$$= \sqrt{\frac{(0.09-4.95)^2 + (16.40-4.95)^2}{15-1}}$$

$$= 5.22$$

The value is 1.017 so the range would be (1-2) and therefore the skewed should be moderately positively skewed distribution.

Ans to the Q. no - 2

2(a)

Unhappy with the majors = $\frac{129}{129+101}$

$= 0.56$ Ans

2(b)

Students happy with Communication = $\frac{33}{101}$

$= 0.326$ Ans

2(c)

$\frac{43+33}{101}$

$= \frac{76}{101}$

$= 0.75$ Ans

2(d)

$\frac{57+27}{129} = 0.65$ Ans

Ans. to the Q.no - 3

3(a)

$n = 5$

'x' is the binomial variance with

Probability $= \frac{82}{100} = \frac{41}{50}$

$$f(x; 5, \tfrac{1}{5}) = \binom{5}{x} \left(\frac{41}{50}\right)^x \left(\frac{41}{50}\right)^{5-x}$$

for x = next 5 times.

a) $P[\text{exactly } 5] = P[x=5] = \binom{5}{5}\left(\frac{41}{50}\right)^5 \left(\frac{41}{50}\right)^{5-5}$

$\frac{5!}{5!(5-5)!} \times 0.3040$

$= 0.3040$ Ans.

$\frac{5!}{5!(5-5)!} \times 3.2 \times 10^{-4}$

$= 1 \times (3.2 \times 10^{-4})$

$= 3.2 \times 10^{-4}$

(2)

$\frac{5!}{5!(5-5)!} \times 0.3040$

$= 0.3040$ Ans.

$= \frac{5!}{5!(5-5)!} (3.2 \times 10^{-4})$

$= \frac{5!}{5!(5-5)!} \times 3.2 \times 10^{-4}$

$= 1 \times (3.2 \times 10^{-4})$

$= 3.2 \times 10^{-4}$ Ans.

3(b)

$$p[\text{at least 4 tries}] = p[x \geq 4] = p[x=4] + p[x=5]$$

$$= \binom{5}{4}\left(\frac{41}{50}\right)^4\left(\frac{41}{50}\right)^{5-4} + \binom{5}{5}\left(\frac{41}{50}\right)^5\left(\frac{41}{50}\right)^{5-5}$$

$$= 5 \times 0.3707 + 0.3707$$

$$= 2.2242 \text{ Ans.}$$

3(c)

$$p[\text{none}] = p[x=0] = \binom{5}{0}\left(\frac{41}{50}\right)^0\left(\frac{41}{51}\right)^{5-0}$$

$$\frac{5!}{0!(5-0)!} \times \left(\frac{41}{5}\right)^5$$

$$= 0.3707 \text{ Ans.}$$

3(d)

Mean is the np

$$= 5 \times \left(\frac{41}{50}\right)$$

$$= 4.1 \text{ Ans.}$$

Variance is $= npq$

$$= 5 \times \frac{41}{50} \times \frac{9}{50} \quad \Big| \quad q = 1-p$$

$$= 0.738 \text{ Ans}$$

Ans. to the Q.no 5 :-

5(a)

$$P(x < 55) = P\left(\frac{x-48}{6} < \frac{55-48}{6}\right)$$

$$= P\left(z < \frac{55-48}{7}\right)$$

$$= P(z < 1)$$

$$= P(-\infty < z < 1)$$

$$= 0.8413 \text{ (using normal table)}$$

$\Rightarrow$ That is 84.13% of the student ... Ans.

5(b)

$$P(x > 95) = P\left(\left(\frac{x-48}{6}\right) > \left(\frac{95-48}{6}\right)\right)$$

$$= P\left(z > \frac{95-48}{7}\right)$$

$$= P(z > 6.71)$$

$$= P(-\infty > z > 6.71)$$

5(c) $P(75 < 490) = P\left(\frac{75-48}{6} < \frac{x-48}{6} < \frac{90-48}{6}\right)$

$$= P\left(\frac{75-48}{7} < z < \frac{90-48}{7}\right)$$

$$= P(3.85 < z < 6)$$

$$= P(-\infty < z < 6) - P(-\infty < z < 3.85)$$

Ans.