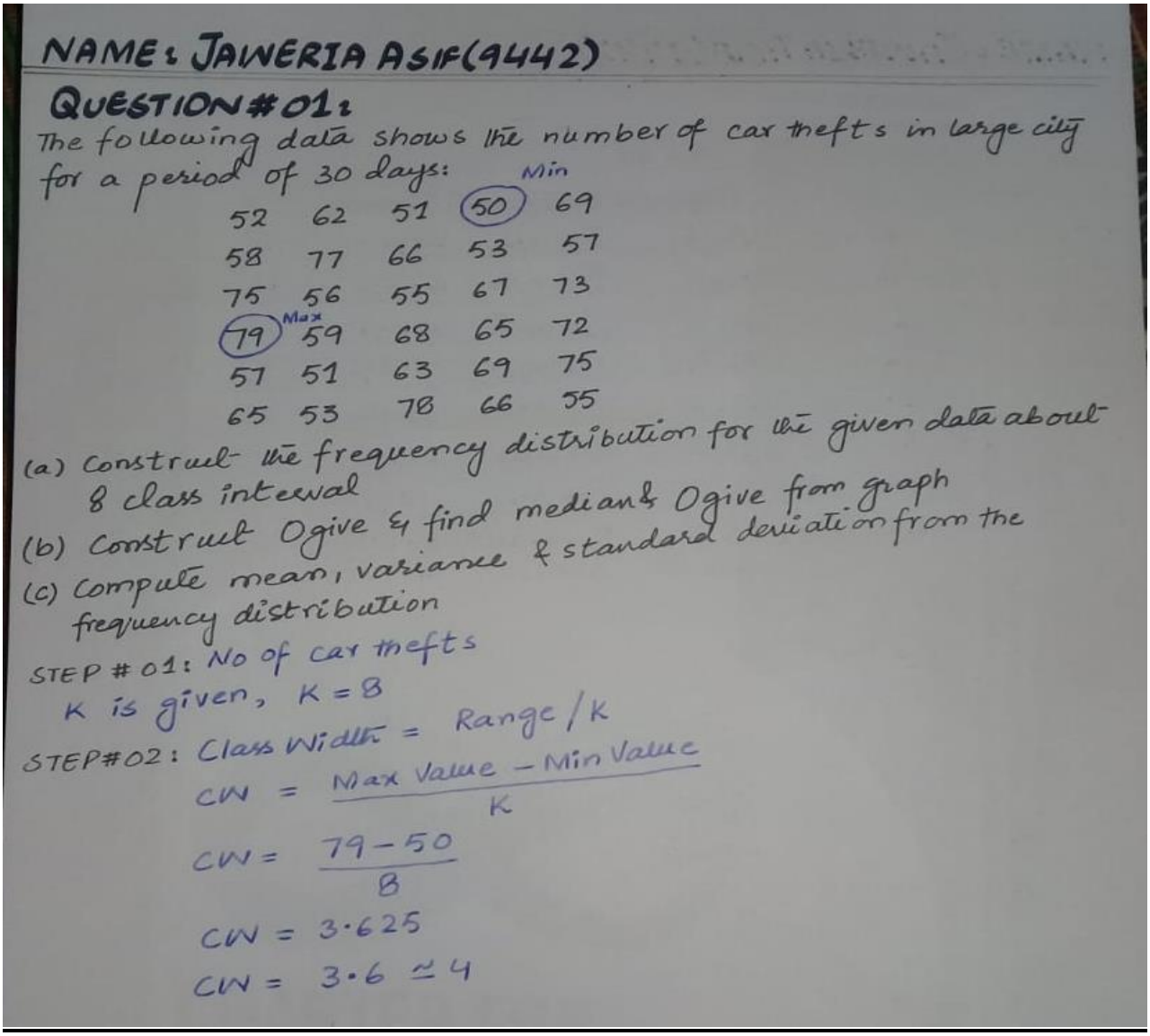
ASSIGNMENT #03
NAME: JAWERIA ASIF
COURSE ID: 103767
SUBMITTED BY: JAWERIA ASIF

SUBMITTED TO:

SIR SHAHBAZ KHAN

QUESTION #01:



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QUESTION #01:

The following data shows the number of car thefts in large city for a period of 30 days:

52	62	51	(50) Min	69
58	77	66	53	57
75	56	55	67	73
(79) Max	59	68	65	72
57	51	63	69	75
65	53	78	66	55

(a) Construct the frequency distribution for the given data about 8 class interval

(b) Construct Ogive & find median & Ogive from graph

(c) Compute mean, variance & standard deviation from the frequency distribution

STEP # 01: No of car thefts

K is given, K = 8

STEP#02: Class Width = Range / K

$$CW = \frac{\text{Max Value} - \text{Min Value}}{K}$$

$$CW = \frac{79-50}{8}$$

$$CW = 3.625$$

$$CW = 3.6 \simeq 4$$

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ASSIGNMENTS

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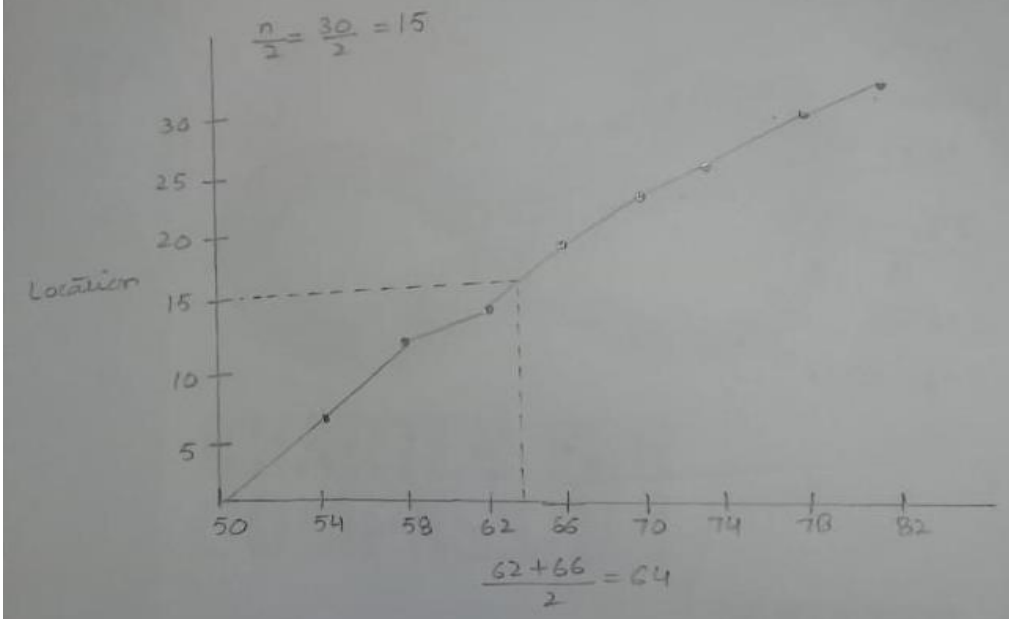
STEP #03:

$n = 30$

Class Boundaries	Telly Marks	Frequency	R. Frequency	P. Frequency	CF
$50 \leq x < 54$	𝍸 I	$F_1 = 6$	$6/30 = 0.2$	20%	6
$54 \leq x < 58$	𝍸	$F_2 = 5$	$5/30 = 0.166$	16.6%	11
$58 \leq x < 62$	II	$F_3 = 2$	$2/30 = 0.066$	6.6%	13
$62 \leq x < 66$	IIII	$F_4 = 4$	$4/30 = 0.133$	13.3%	17
$66 \leq x < 70$	𝍸 I	$F_5 = 6$	$6/30 = 0.2$	20%	23
$70 \leq x < 74$	II	$F_6 = 2$	$2/30 = 0.066$	6.6%	25
$74 \leq x < 78$	III	$F_7 = 3$	$3/30 = 0.1$	10%	28
$78 \leq x < 82$	II	$F_8 = 2$	$2/30 = 0.066$	6.6%	30
		$\Sigma F = 30$	$\Sigma RF = 1$	$\Sigma PF = 100\%$	



Median = 64

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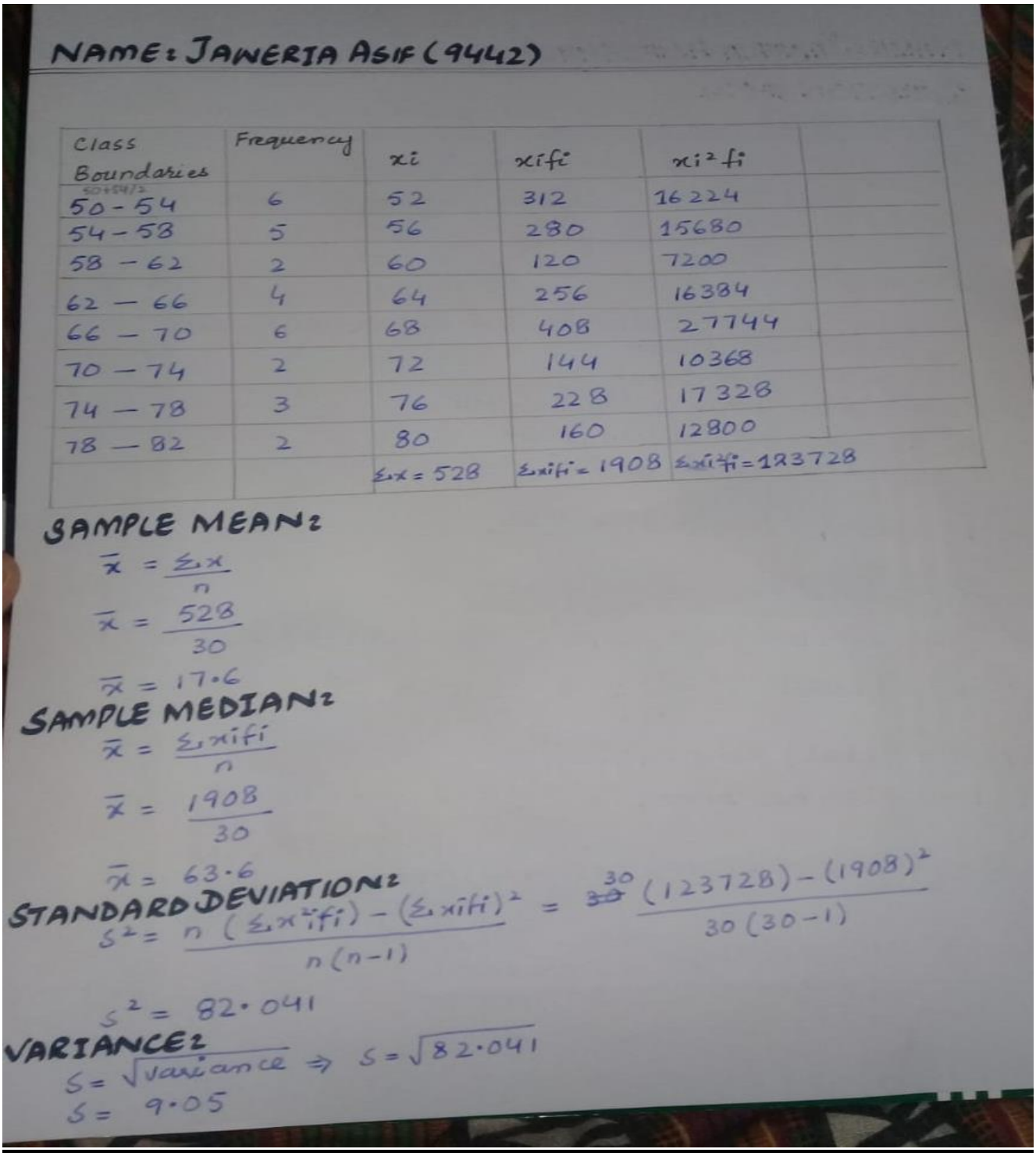

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Class Boundaries	Frequency	x_i	$x_i f_i$	$x_i^2 f_i$
50-54	6	52	312	16224
54-58	5	56	280	15680
58-62	2	60	120	7200
62-66	4	64	256	16384
66-70	6	68	408	27744
70-74	2	72	144	10368
74-78	3	76	228	17328
78-82	2	80	160	12800
		$\Sigma x = 528$	$\Sigma x_i f_i = 1908$	$\Sigma x_i^2 f_i = 123728$

SAMPLE MEAN:

$$\bar{x} = \frac{\Sigma x}{n}$$

$$\bar{x} = \frac{528}{30}$$

$$\bar{x} = 17.6$$

SAMPLE MEDIAN:

$$\bar{x} = \frac{\Sigma x_i f_i}{n}$$

$$\bar{x} = \frac{1908}{30}$$

$$\bar{x} = 63.6$$

STANDARD DEVIATION:

$$s^2 = \frac{n(\Sigma x^2 f_i) - (\Sigma x_i f_i)^2}{n(n-1)} = \frac{30(123728) - (1908)^2}{30(30-1)}$$

$$s^2 = 82.041$$

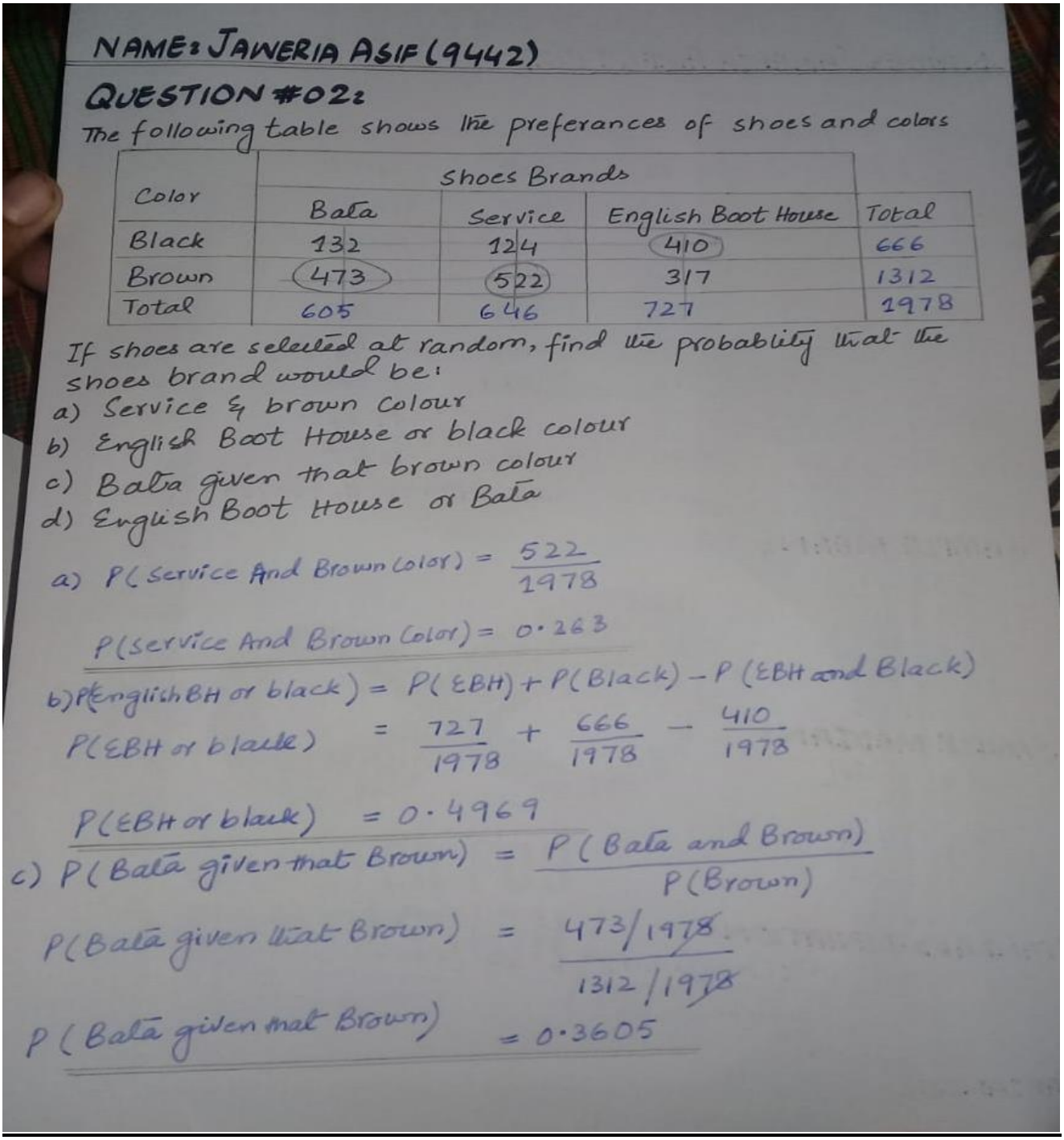
VARIANCE:

$$s = \sqrt{\text{variance}} \Rightarrow s = \sqrt{82.041}$$

$$s = 9.05$$

----------**End of Question # 01**----------

QUESTION #02:



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QUESTION #02:

The following table shows the preferances of shoes and colors

Color	Shoes Brands			
	Bata	Service	English Boot House	Total
Black	132	124	410	666
Brown	473	522	317	1312
Total	605	646	727	1978

If shoes are selected at random, find the probability that the shoes brand would be:

a) Service & brown colour
b) English Boot House or black colour
c) Bata given that brown colour
d) English Boot House or Bata

a) $P(\text{Service And Brown Color}) = \frac{522}{1978}$

$P(\text{Service And Brown Color}) = 0.263$

b) $P(\text{English BH or black}) = P(\text{EBH}) + P(\text{Black}) - P(\text{EBH and Black})$

$P(\text{EBH or black}) = \frac{727}{1978} + \frac{666}{1978} - \frac{410}{1978}$

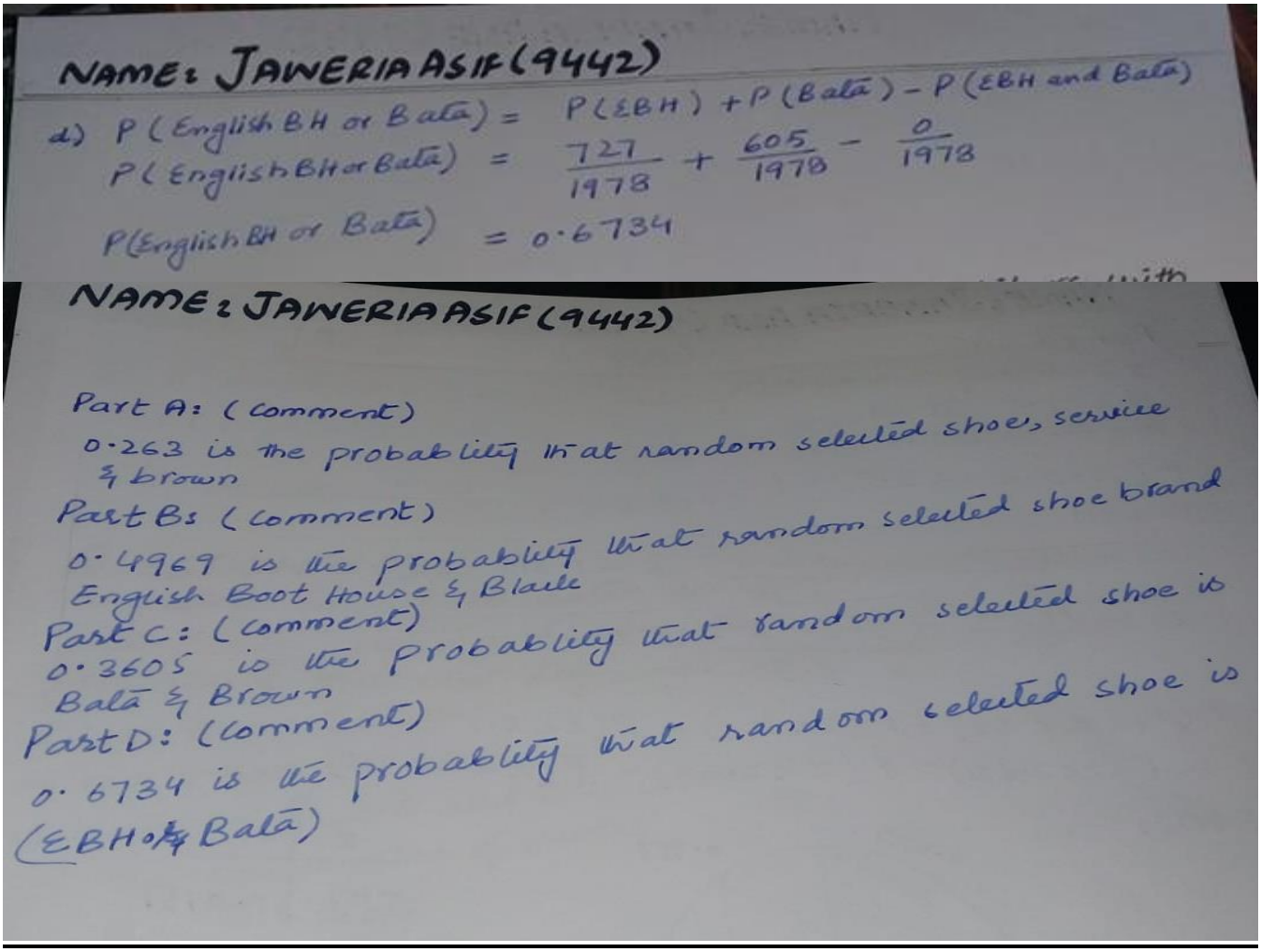
$P(\text{EBH or black}) = 0.4969$

c) $P(\text{Bata given that Brown}) = \frac{P(\text{Bata and Brown})}{P(\text{Brown})}$

$P(\text{Bata given that Brown}) = \frac{473/1978}{1312/1978}$

$P(\text{Bata given that Brown}) = 0.3605$

----------**Part D is Continue on next page**----------



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d) P(English BH or Bata) = P(EBH) + P(Bata) - P(EBH and Bata)

$P(\text{English BH or Bata}) = \frac{727}{1978} + \frac{605}{1978} - \frac{0}{1978}$

P(English BH or Bata) = 0.6734

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Part A: (comment)
0.263 is the probability that at random selected shoe, service & brown

Part B: (comment)
0.4969 is the probability that at random selected shoe brand English Boot House & Blaile

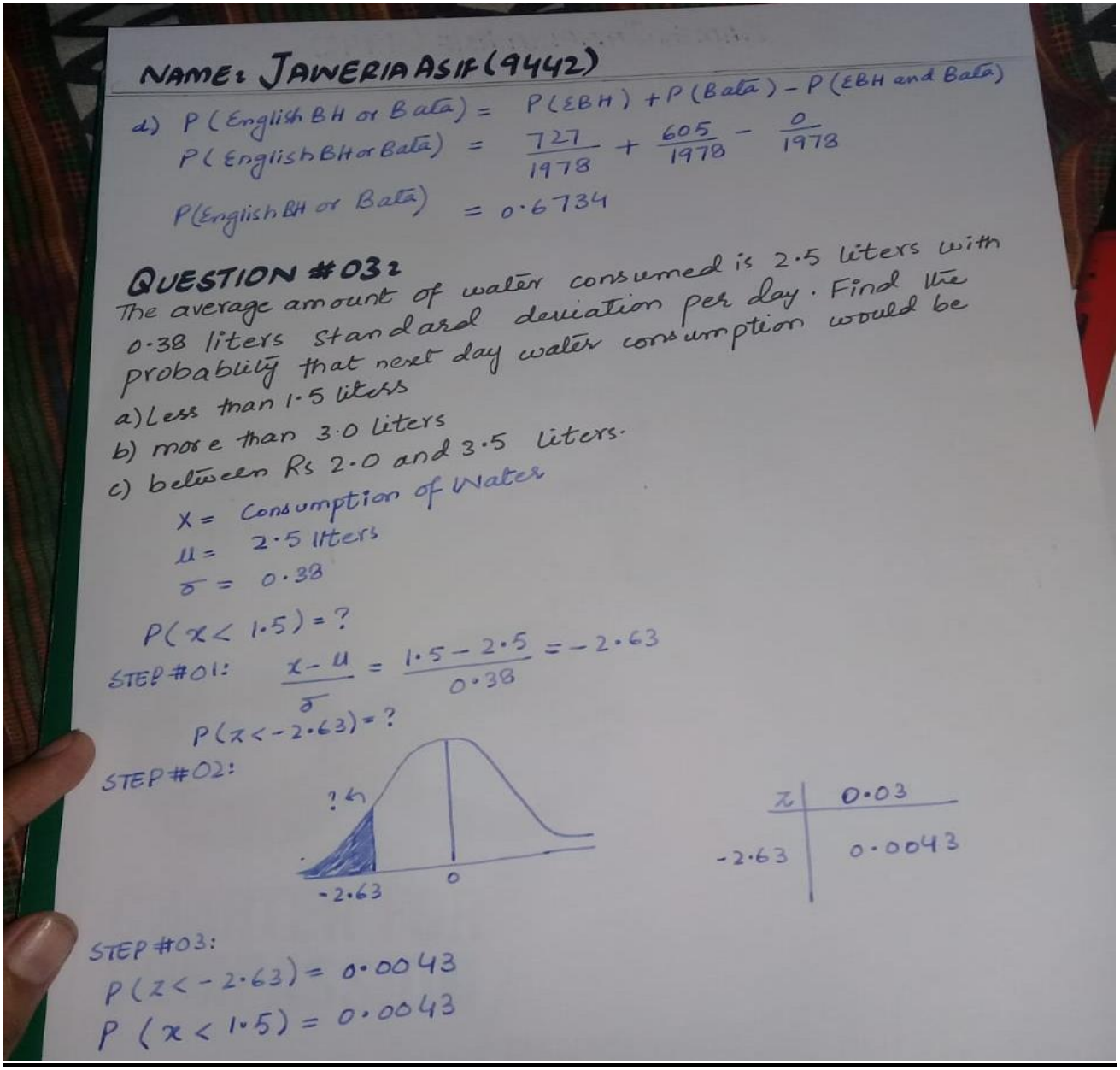
Part C: (comment)
0.3605 is the probability that random selected shoe is Bata & Brown

Part D: (comment)
0.6734 is the probability that random selected shoe is (EBH or Bata)

----------**End of Question # 02**----------

QUESTION #03:

PART A:



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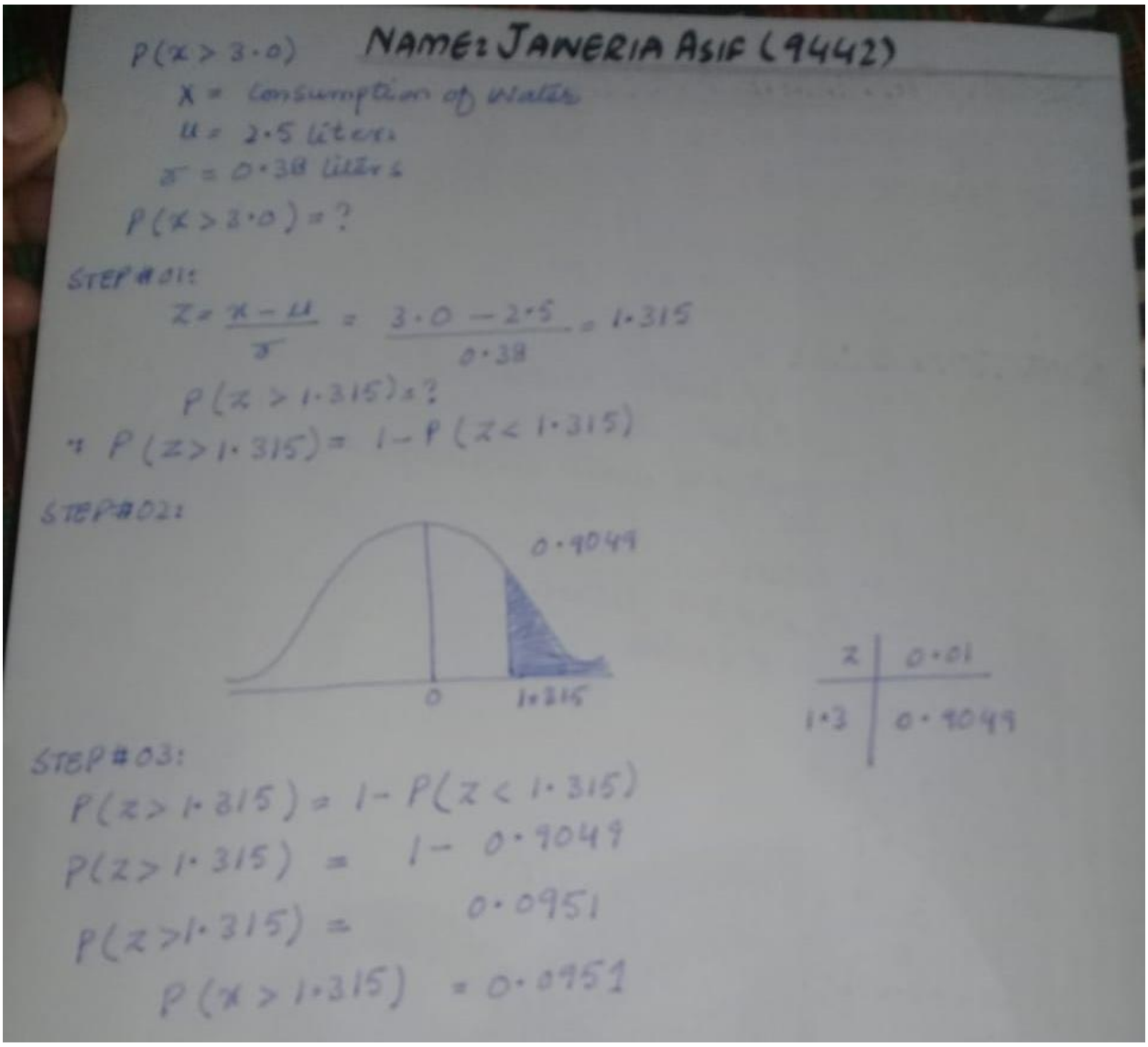

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Part C:

X = Consumption of Water

$\mu = 2.5$ litres

$\sigma = 0.38$ liters

$P(2.0 < x < 3.5) = ?$

STEP#01:

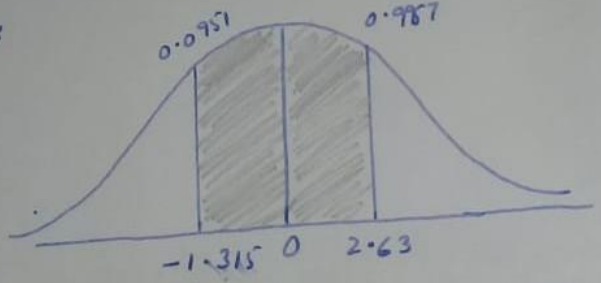
$$z_1 = \frac{x_1 - \mu}{\sigma} = \frac{2.0 - 2.5}{0.38} = -1.315$$

$$z_2 = \frac{x_2 - \mu}{\sigma} = \frac{3.5 - 2.5}{0.38} = 2.631$$

$\because P(z_1 < z < z_2) = P(z < z_2) - P(z < z_1)$

$P(-1.31 < z < 2.631) = P(z < 2.63) - P(z < -1.315)$

STEP#02:



z	0.01
-1.3	0.0951

z	0.03
2.6	0.9957

STEP#03:

$P(-1.315 < z < 2.63) = P(z < 2.63) - P(z < -1.315)$

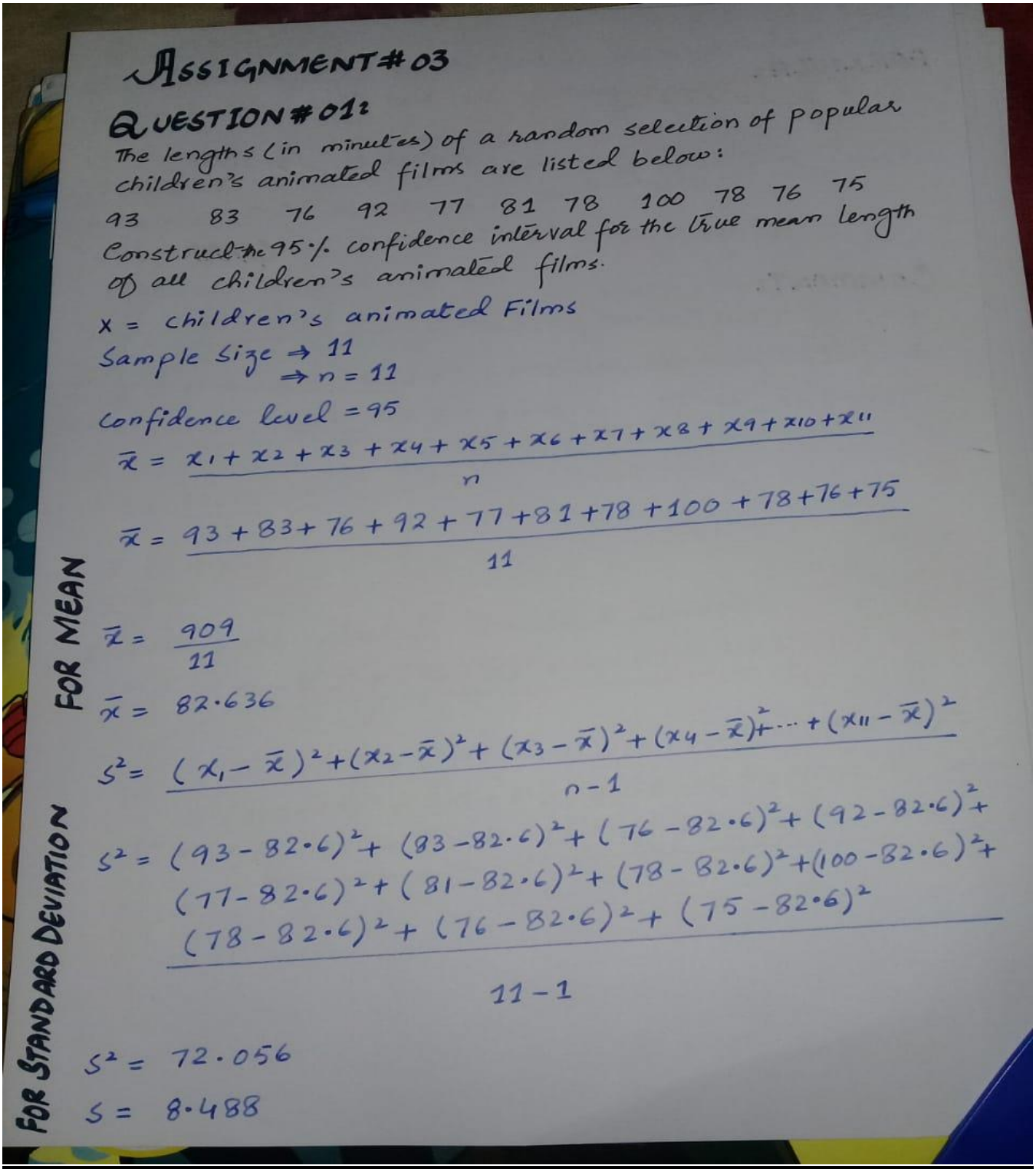
$= 0.9957 - 0.0951$

$= 0.9006$

$P(-1.315 < x < 2.63) = 0.9006$

----------End of Question # 03****----------**

QUESTION #04:



ASSIGNMENT#03

QUESTION#01:

The lengths (in minutes) of a random selection of popular children's animated films are listed below:

93 83 76 92 77 81 78 100 78 76 75

Construct the 95% confidence interval for the true mean length of all children's animated films.

x = children's animated Films

Sample size ⇒ 11

⇒ n = 11

Confidence level = 95

FOR MEAN

$$\bar{x} = \frac{x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8 + x_9 + x_{10} + x_{11}}{n}$$

$$\bar{x} = \frac{93 + 83 + 76 + 92 + 77 + 81 + 78 + 100 + 78 + 76 + 75}{11}$$

$$\bar{x} = \frac{909}{11}$$

$$\bar{x} = 82.636$$

FOR STANDARD DEVIATION

$$s^2 = \frac{(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + (x_3 - \bar{x})^2 + (x_4 - \bar{x})^2 + \cdots + (x_{11} - \bar{x})^2}{n - 1}$$

$$s^2 = \frac{(93 - 82.6)^2 + (83 - 82.6)^2 + (76 - 82.6)^2 + (92 - 82.6)^2 + (77 - 82.6)^2 + (81 - 82.6)^2 + (78 - 82.6)^2 + (100 - 82.6)^2 + (78 - 82.6)^2 + (76 - 82.6)^2 + (75 - 82.6)^2}{11 - 1}$$

$$s^2 = 72.056$$

$$s = 8.488$$

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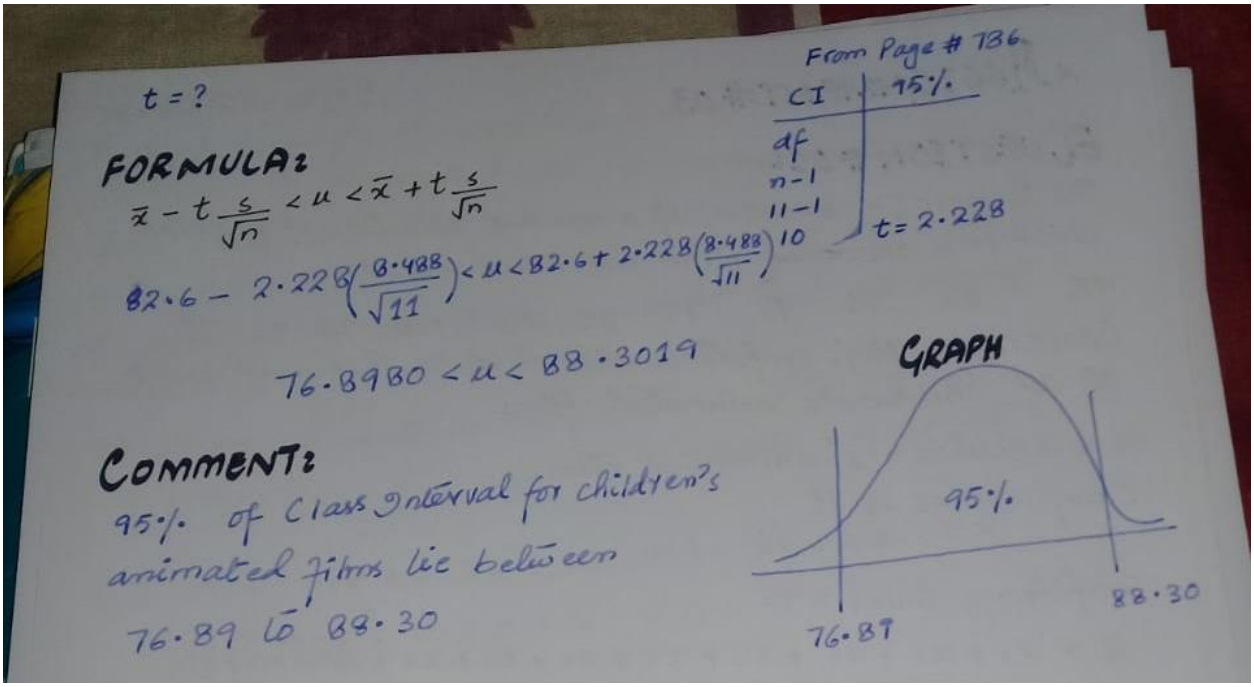
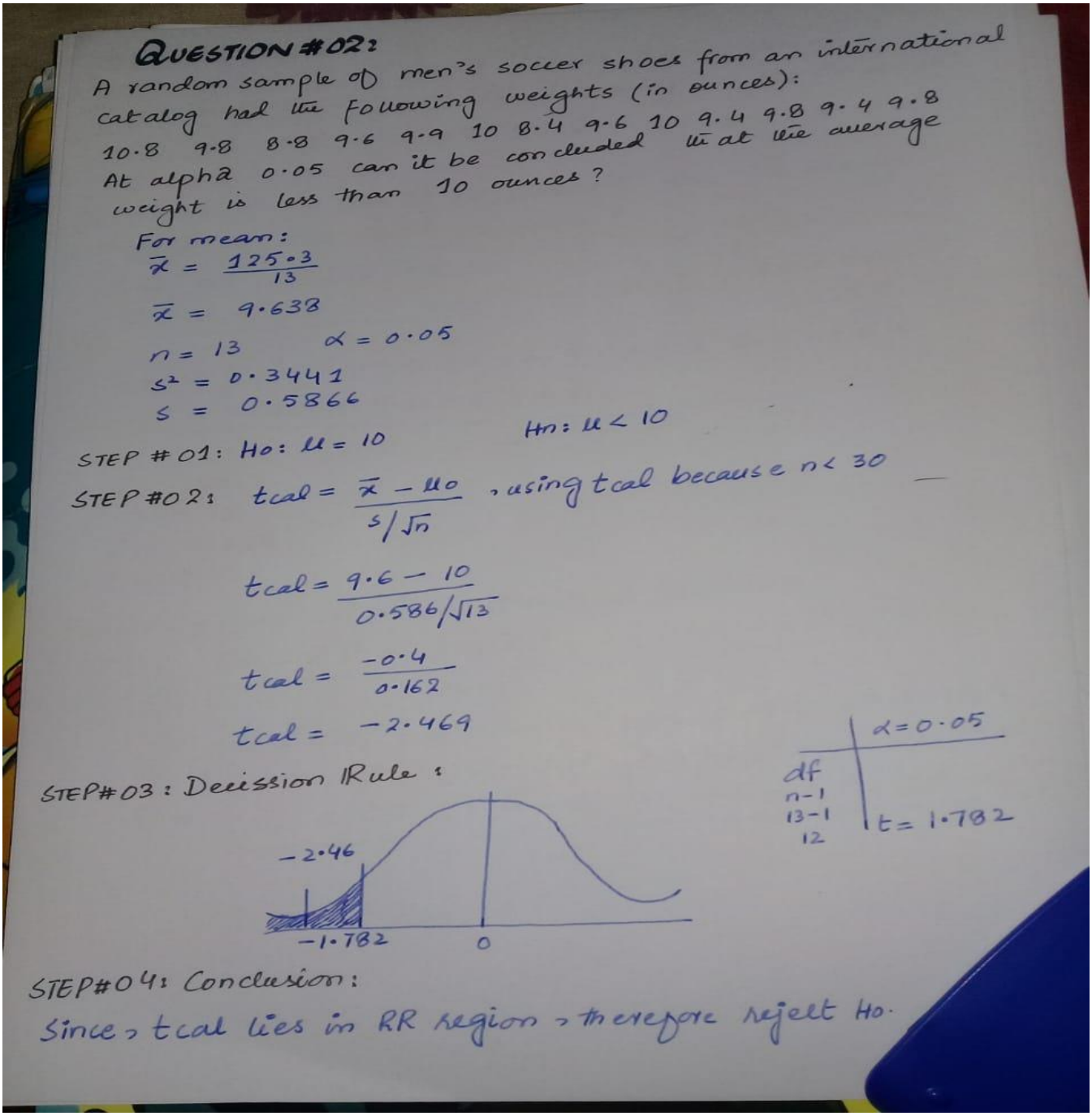


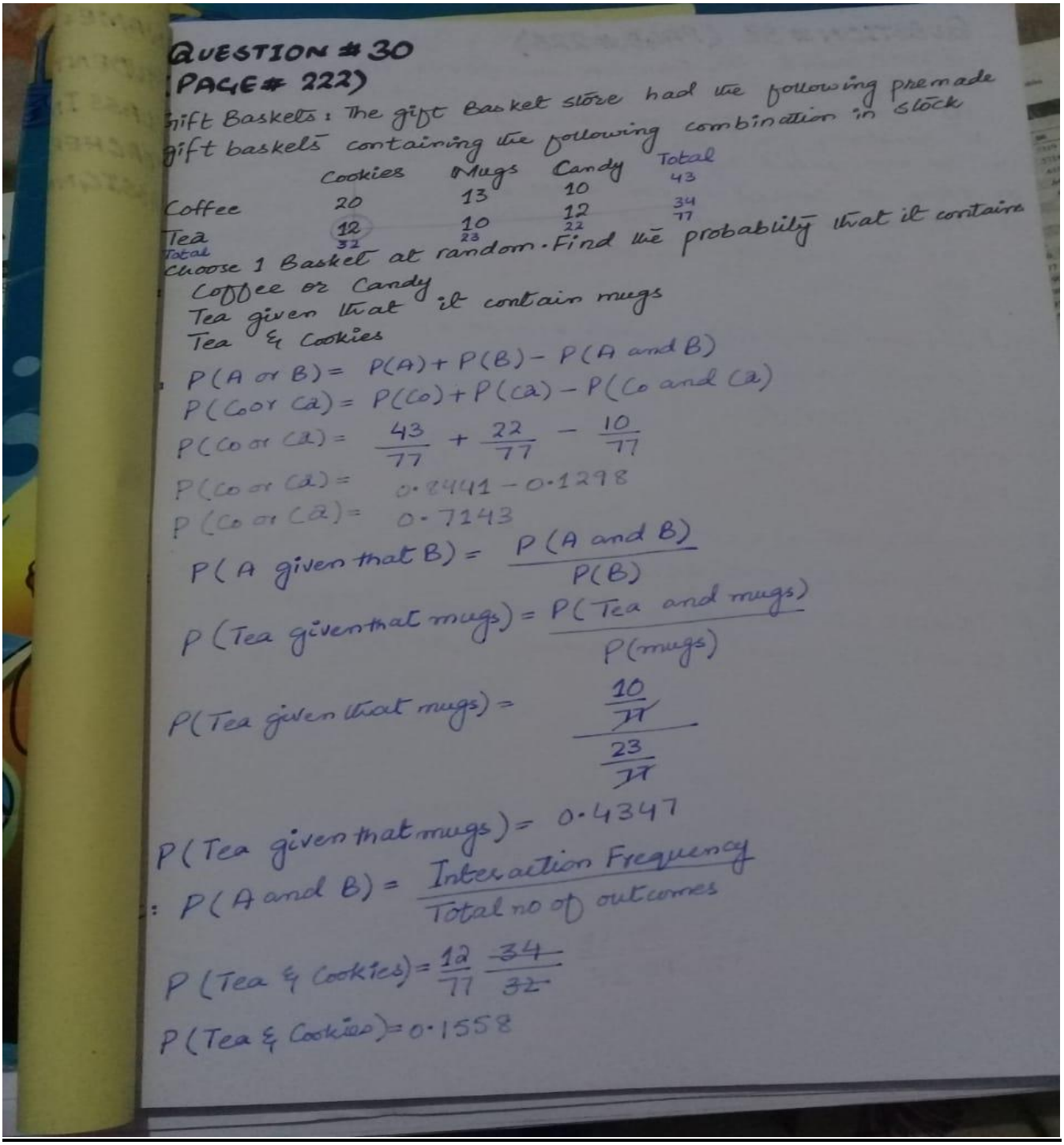
----------End of Question # 04****----------**

QUESTION #05:



----------End of Question # 05****----------**

QUESTION #06:



QUESTION # 30
(PAGE# 222)

Gift Baskets: The gift Basket store had the following premade gift baskets containing the following combination in stock

	Cookies	Mugs	Candy	Total
Coffee	20	13	10	43
Tea	12	10	12	34
Total	32	23	22	77

Choose 1 Basket at random. Find the probability that it contains

Coffee or Candy
Tea given that it contain mugs
Tea & Cookies

$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

$P(Co \text{ or } Ca) = P(Co) + P(Ca) - P(Co \text{ and } Ca)$

$P(Co \text{ or } Ca) = \frac{43}{77} + \frac{22}{77} - \frac{10}{77}$

$P(Co \text{ or } Ca) = 0.8441 - 0.1298$

$P(Co \text{ or } Ca) = 0.7143$

$P(A \text{ given that } B) = \frac{P(A \text{ and } B)}{P(B)}$

$P(\text{Tea given that mugs}) = \frac{P(\text{Tea and mugs})}{P(\text{mugs})}$

$P(\text{Tea given that mugs}) = \frac{\frac{10}{77}}{\frac{23}{77}}$

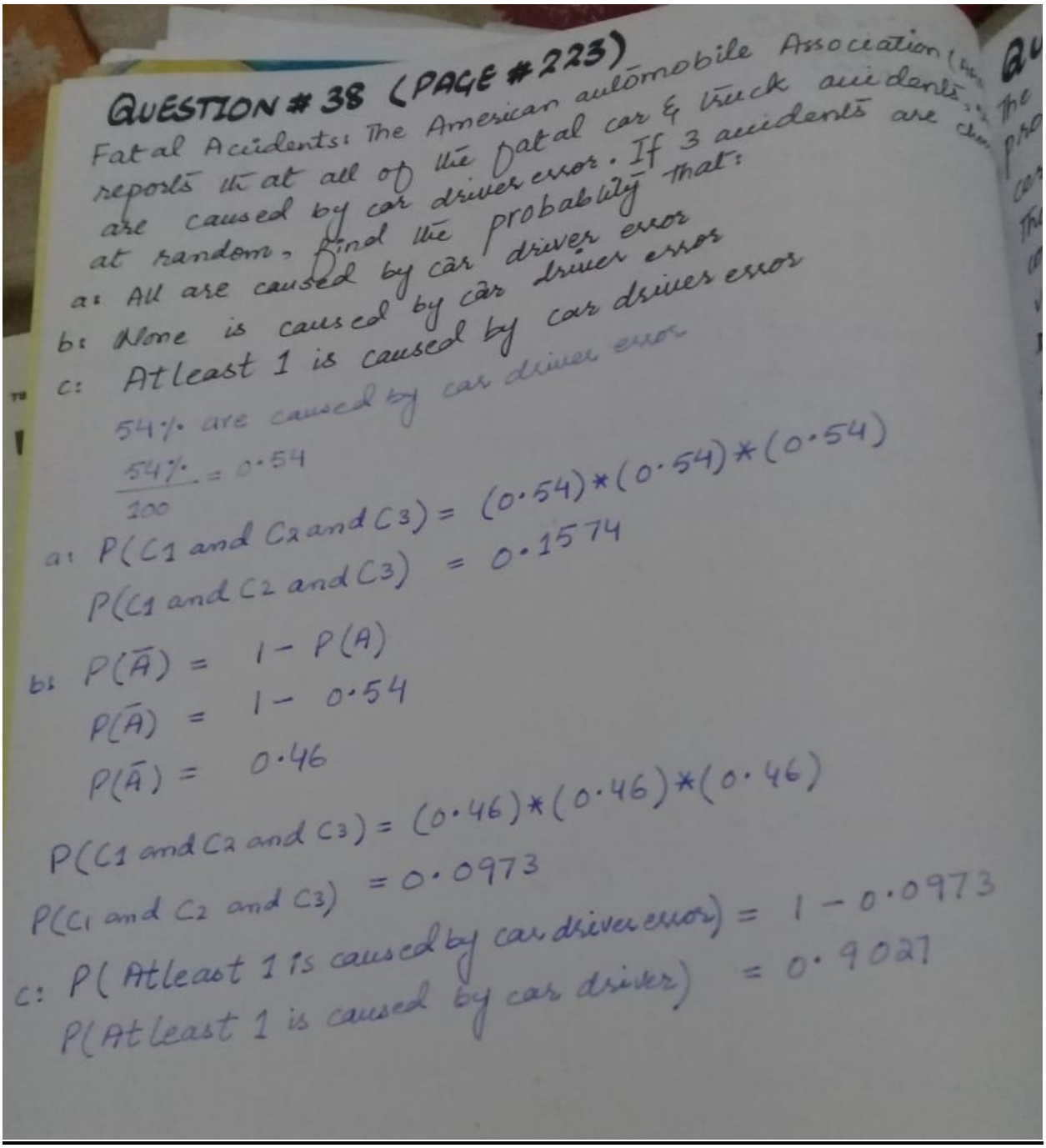
$P(\text{Tea given that mugs}) = 0.4347$

$P(A \text{ and } B) = \frac{\text{Interaction Frequency}}{\text{Total no of outcomes}}$

$P(\text{Tea \& Cookies}) = \frac{12}{77} \frac{34}{32}$

$P(\text{Tea \& Cookies}) = 0.1558$

QUESTION #07:



QUESTION # 38 (PAGE # 223)

Fatal Accidents: The American automobile Association (the reports that all of the fatal car & truck accidents are caused by car driver error. If 3 accidents are chosen at random, find the probability that:

a: All are caused by car driver error

b: None is caused by car driver error

c: Atleast 1 is caused by car driver error

54% are caused by car driver error

$\frac{54\%}{100} = 0.54$

a: $P(C_1 \text{ and } C_2 \text{ and } C_3) = (0.54)*(0.54)*(0.54)$

$P(C_1 \text{ and } C_2 \text{ and } C_3) = 0.1574$

b: $P(\bar{A}) = 1 - P(A)$

$P(\bar{A}) = 1 - 0.54$

$P(\bar{A}) = 0.46$

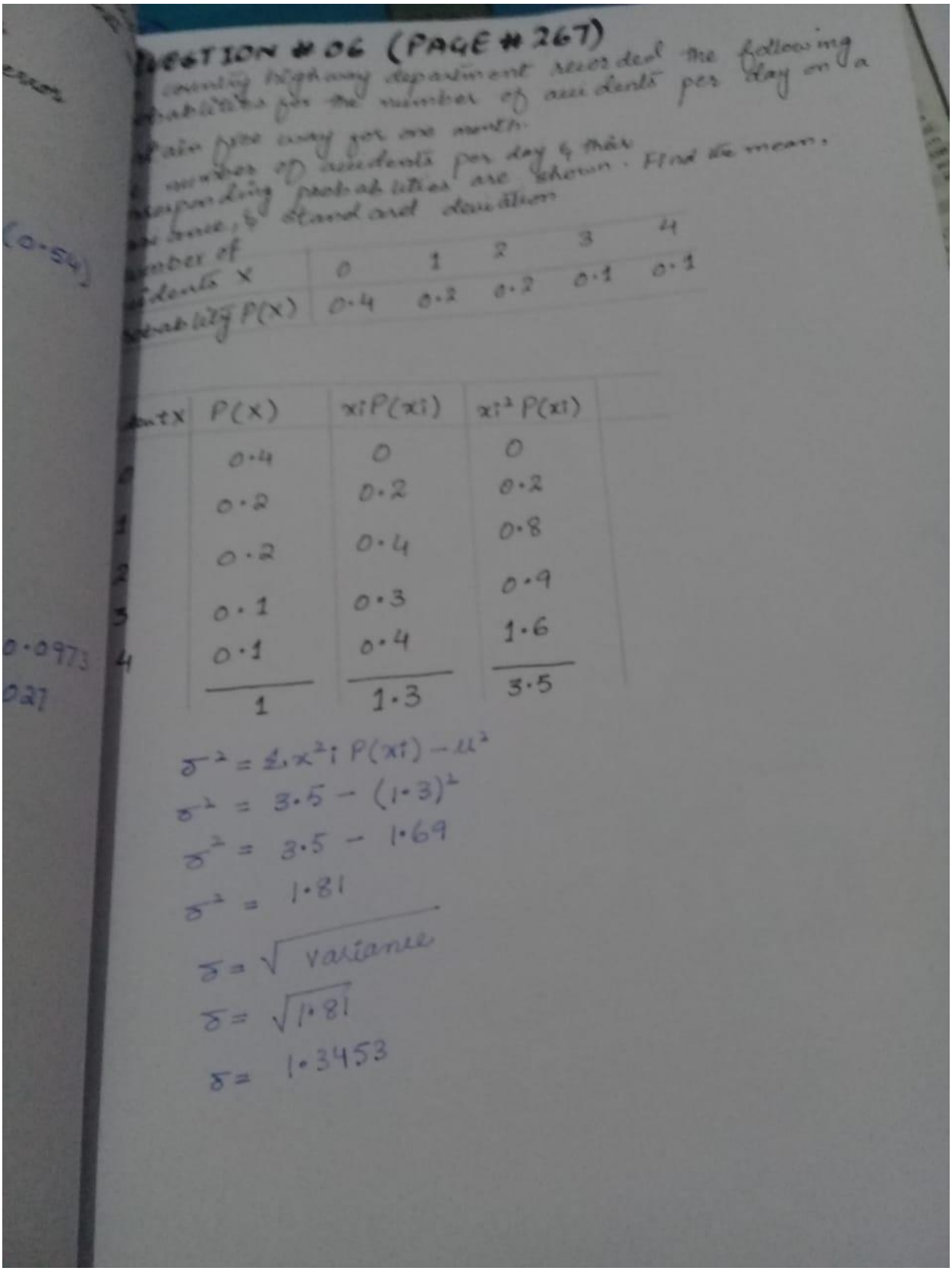
$P(C_1 \text{ and } C_2 \text{ and } C_3) = (0.46)*(0.46)*(0.46)$

$P(C_1 \text{ and } C_2 \text{ and } C_3) = 0.0973$

c: $P(\text{Atleast 1 is caused by car driver error}) = 1 - 0.0973$

$P(\text{Atleast 1 is caused by car driver}) = 0.9027$

QUESTION #08:



QUESTION # 06 (PAGE # 267)

county highway department recorded the following probabilities for the number of accidents per day on a certain free way for one month.

number of accidents per day & their corresponding probabilities are shown. Find the mean, variance, & standard deviation

number of accidents x	0	1	2	3	4
probability P(x)	0.4	0.2	0.2	0.1	0.1

x	P(x)	xiP(xi)	xi² P(xi)
0	0.4	0	0
1	0.2	0.2	0.2
2	0.2	0.4	0.8
3	0.1	0.3	0.9
4	0.1	0.4	1.6
	1	1.3	3.5

$\sigma^2 = \Sigma x^2 i\, P(xi) - \mu^2$

$\sigma^2 = 3.5 - (1.3)^2$

$\sigma^2 = 3.5 - 1.69$

$\sigma^2 = 1.81$

$\sigma = \sqrt{\text{variance}}$

$\sigma = \sqrt{1.81}$

$\sigma = 1.3453$

ASSIGNMENTS