

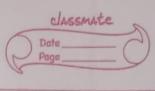
HOMEWORK ASSIGNMENT-1

Name: DAKSH BHUVA (WID: 10475468 Problem 1. Probability Major Session 1 Session 2 Session 3 CS 6 10 6 STAT 8 10 6 MG 6 8 =) Given p(s1)= 0.2, p(s2)=0.2, p(s3)=0.6 Probability that selected stutlent has
major in CS: r: P(cs) = P(cs, s1) + p(cs, s2) + p(cs, s3) marginal Distribution ve know, p(cs, s) = p(cs | si) · p(s) > Conditional Distribution : P(c5) = p(c5 |51) · p(51) + p (c5 |52) · p(52) + p (65 163) · p(53) = 6 + 10 + 18 = 34 100 100 100

: P(C5)= 10.34

(2) Probability that Student is from session3, given student is from STAT: (STAT | S3) = p(S3 | S+At) . p(Stat) 9 Because P (63 15TAT) = P (63 A STAT) .. P (53 N STAT) = P (53 | STAT) . P(STAT) · p (53 /5TAT) = p (5TAT | 53) · p(53) NOW P(STAT | 53) = 6 -> ALSO, P(STAT) = P(STAT, SI) + P(STAT, SZ) = p (STAT (SI) P (STAT (S2) - PE) + p (STAT (53) P (53) 8.62 + 10 .2 + 6 .6 20 10 20 10

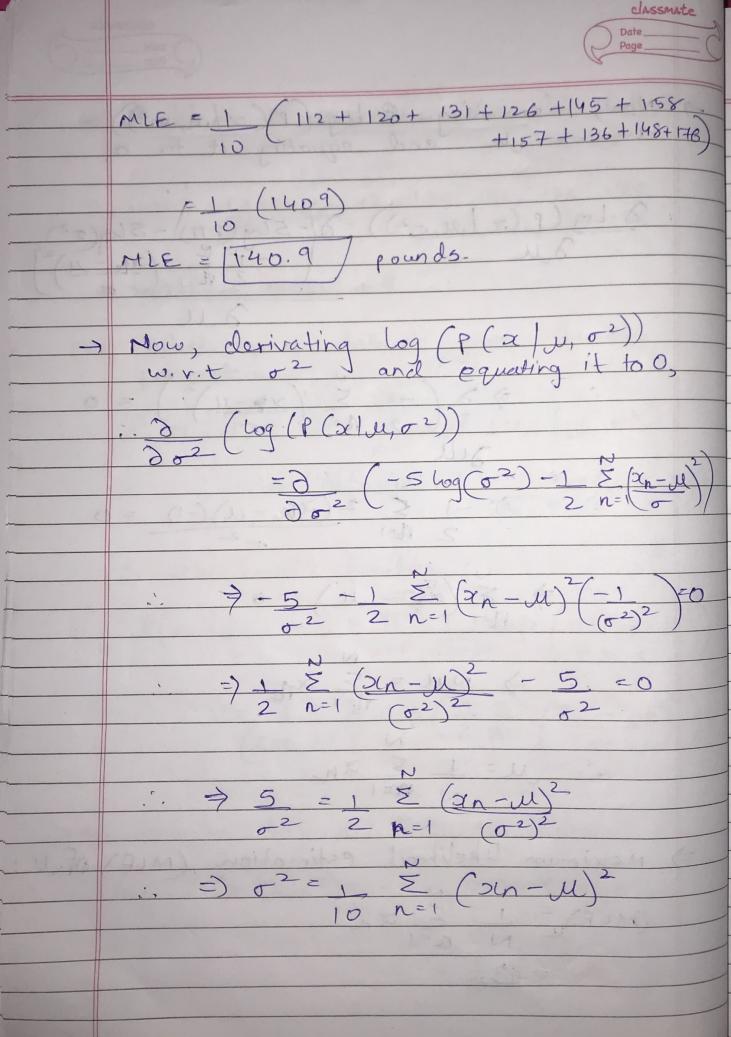
= 36

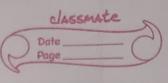


->	Now, putting above values in equation(i)
	· P (53 15TAT) = P (5TAT 163) · P(53) P(5TAT)
	20 10 -11 36 2)
	36 2
	i. p (53 5TAT) = 0.5)
	(= 11 10) 70 11 = (=0,15 10) 9
	the state of the s
	Enter Alette Canin Carolin ;
	i libelihood fundion:
	1 1 1 - C - 11 29
	S S S S S S S S S S S S S S S S S S S
7-1	Eu-122 3 4-7 and 1 -
	The SULL PROPERTY OF THE STATE
	isolitic ail stad to the partiage title
	(1) (2 - (1) () () () () () () () () (
	711-12-3

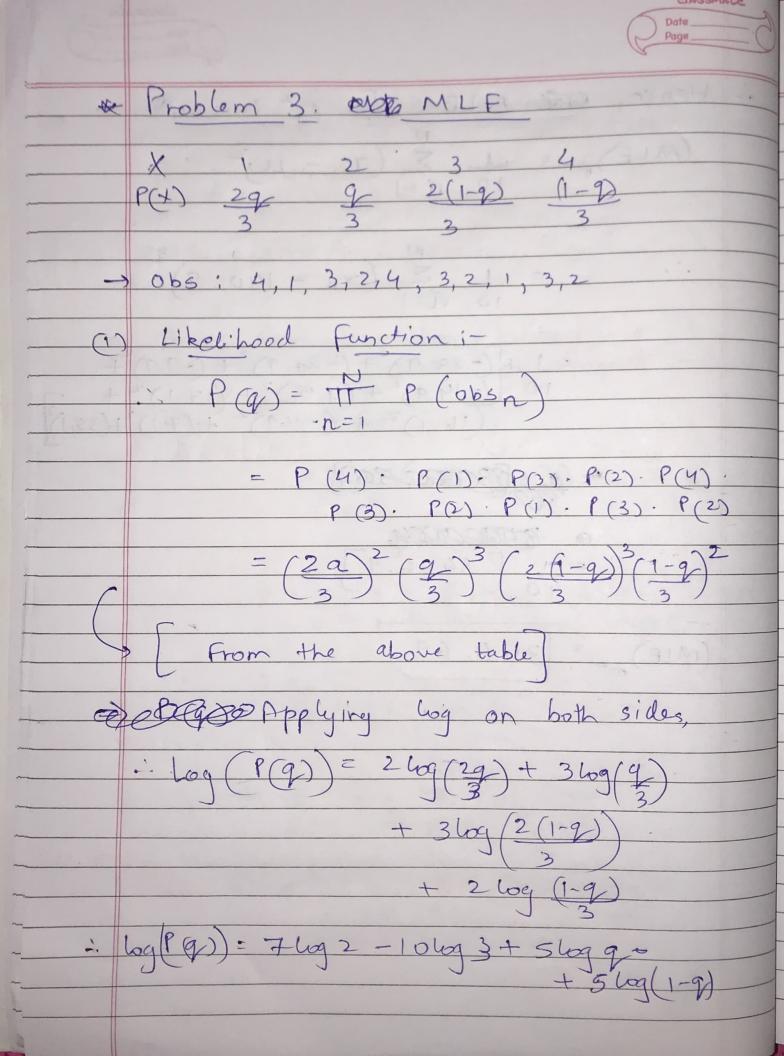
* Problem 2. Mascimum Likelihood Estimation (MLE):biven weights: - 112, 120, 131, 126, 145, 156, 157, 136, 148, 176 a washeren waren and (1) Probability of dataset given the two parameters. .. P (oc lat, o2) = TT st (ocn lat, o2) ; where $N(x|\mu, \sigma^2) = 1 \exp\left(\frac{-1}{2}(x-\mu^2)\right)$:. Likelihood function: $P(x|u, \sigma^2) = TT \int \exp\left(-\frac{1}{2}(x_N - u^2)\right)$ $= 1 \exp\left(-1 \frac{z}{2} \left(\frac{x_{N} - u^{2}}{\sigma}\right)\right)$ $\left(2\pi \sigma^{2}\right)^{5} \exp\left(\frac{1}{2} \frac{z}{N-1} \left(\frac{x_{N} - u^{2}}{\sigma}\right)\right)$ (2) - Applying log or both the sidesilog (P (x / 11, 02) = -5 log (2T) - 5 log (02) $-15\left(2N-41\right)$

	Date Page
7	Now, derivating & log (P(x/M, 02)) w.r.t M and equating it to 0,
	1. 2 log (p (x u, o,2)) = 2 (-5 log (217) -5 log (02) -1 × (x(x-u)²) -2 vi=1 (x(x-u)²)
	2 Maria de la companya della companya della companya de la companya de la companya della company
	$\frac{1}{2} \sqrt{\frac{1}{2} \left(\frac{1}{2} \left(\frac{1}{2} \left(\frac{1}{2} \frac{1}{2} \frac{1}{2} \right) \right)^{2} \right)} = 0$
1/2	$\frac{3u}{2} = \frac{2(2(2-u)(-1))}{2(1-u)} = 0$
	N=1 $N=1$ $N=1$
	NUL = E DUP
	N N N N N N N N N N N N N N N N N N N N
	Maximum likelihood estimation, (MLE) of M:
	(MIE) = I E DIN u N n=1
-	ælde:



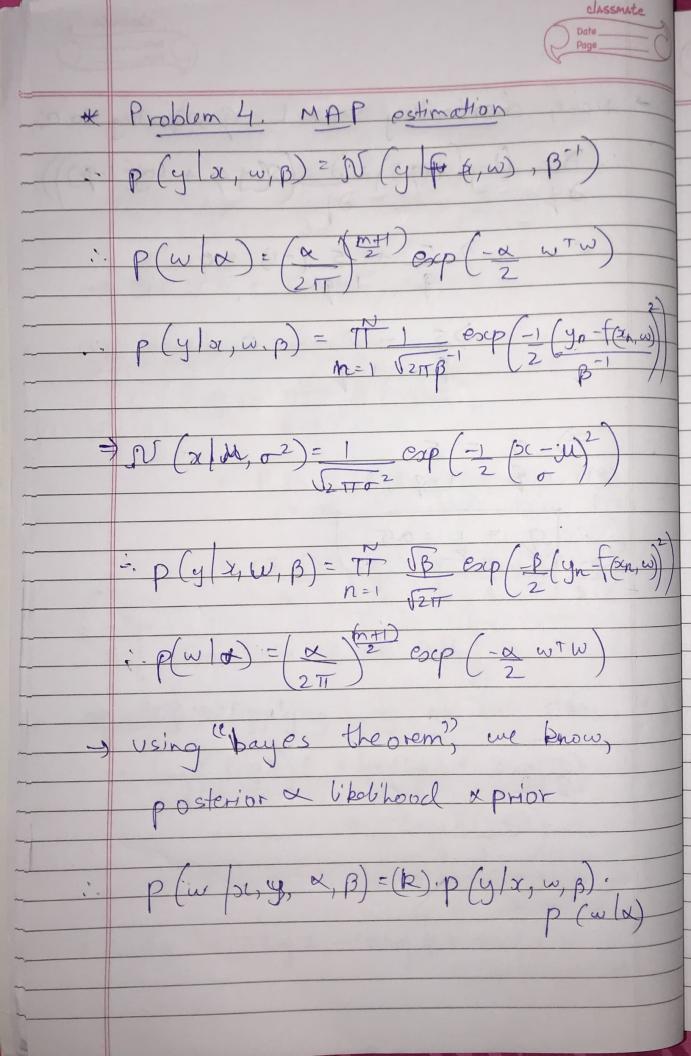


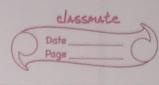
	The state of the s
	Hence, ROBE MLE of 52:
	$(MLF)_2 = 1 \sum_{n=1}^{N} (a_n - \mu)^2$
	10 10:21
	3 3 5
	N N
	$=$ $10 \text{ N} = 1 $ $(2n - 140.9)^2$
	as Especificad Proportion :
	$= \left[\left(-28.9 \right)^{2} + \left(-20.9 \right)^{2} + \left(-9.9 \right)^{2} + \right]$
	10 (-14,9)2+ (4.5)2+ (17,1)2+
	$(16.1)^{2} + (4.5)^{2} + (17.1)^{2} + (16.1)^{2} + (-4.9)^{2} + (7.1)^{2} + (35.1)^{2}$
	4 0 03000 BOD
	TO BUILDO ODONIA
	= 1 [3466.9]
	10 -
	(MLE) = 346.69
	relie stad no par priplad soppies on
-	
	(1) End & (85) Port = (69)
-	
+	((1-1) 5) prote +
	(Sail ged See the sail and a sai
	1- 1/2 miles - c miles - fe ma 1 -





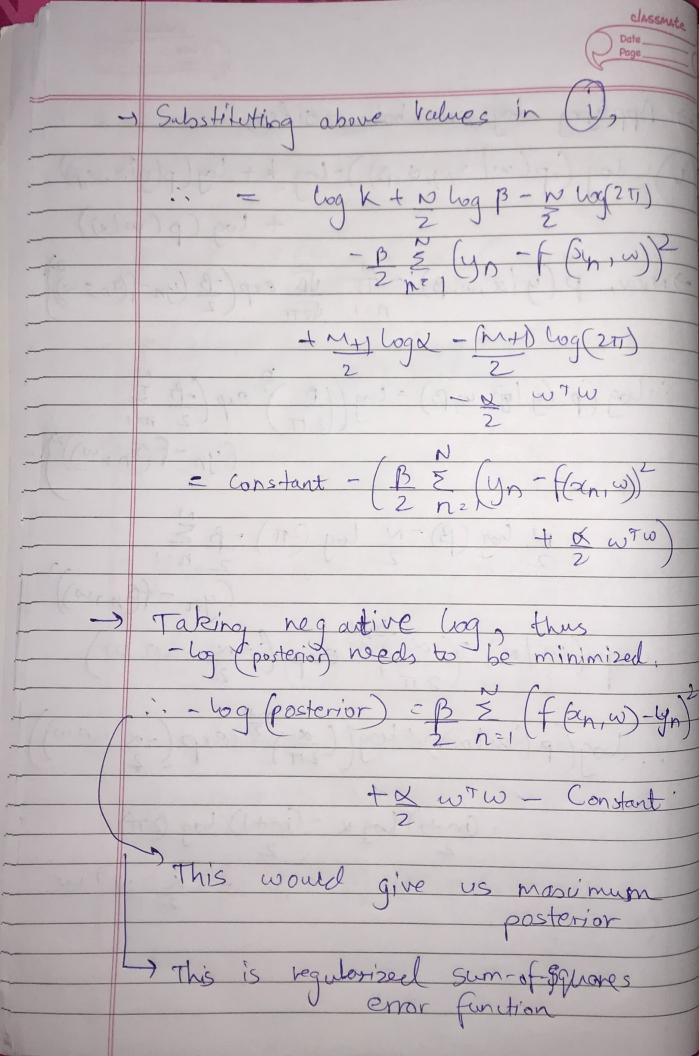
- Now, derivating w.r.t. q, equating to 0: 3 (log (Pg)) = 2 (slog g + 9 1-9 75 -5 =0 (7) 5 = 5 1 (S) M (1) M (5) posterior or liberteend a brief p(1) fry = (1) = (12) p(y/x, u)

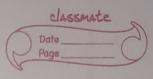




-) Applying log on both sides,

(1): log (p(w|su,y,d,B))=log k+log(p(ylsu,u,B))
+ log (p(wlsu)) + log (p(w/a)) -) Now, $p(y|x,w,\beta) = \prod_{n=1}^{\infty} \int_{\mathbb{R}} \exp\left(-\frac{\beta}{2} \left(y_n - \left(\frac{\alpha_n}{2},w\right)\right)\right)$: log (p (g lg/, w, B) = log (B) = exp (-B) = $(y_n - F(x_n, w))^2$ = N hog (B) - N hog (291) - B E 2 2 n=1 $\frac{(y_n - f(x_n, w))}{p(w|x)} = \frac{(x_n - f(x_n, w))}{2\pi}$ $\log(p(w|x)) = \log((x)^{\frac{m+1}{2}} \exp(-x w + w))$ = (m+1) log x - (m+1) log (277) 2 2 2 w Tw





=		
	Hence proved that maximum posterior (MAP) is equivalent minimizing the regularized sum-of-squares error function.	
	posterior (MAP) is equivalent	to
_	minimizing the regularized	
	sum-of-squares error function	
	'	
_		
_		
_		
_		
_		
		12111
-		