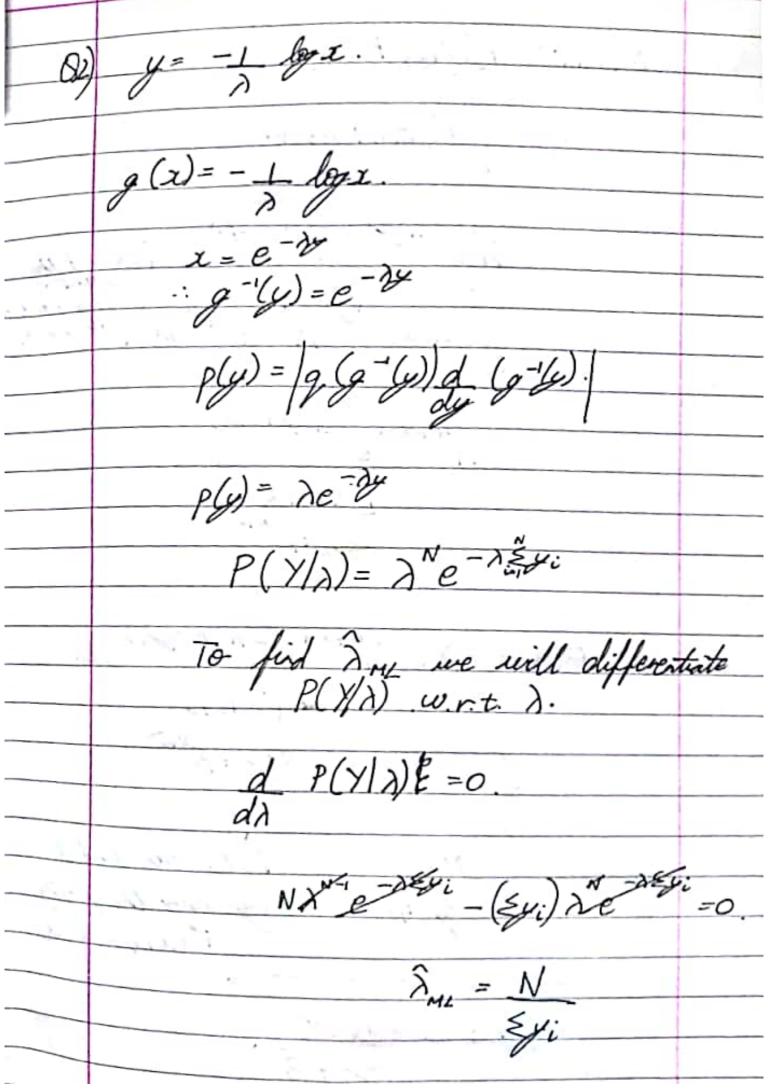
A. Jily	Assignment #5	Page No.:	γουνλ
	ABHINAV KUMAR	0,10	
	180050003	BHASKAR	
		180051	0022
9.1			
	MLE estimate ûme = Zxi/n	3.4	
i)	Graussian prior		
	$P(\mathcal{U} data) = P(data \mathcal{U})P(\mathcal{U}; 10.5, 1)$ $P(data \mathcal{U})P(\mathcal{U}; 10.5, 1)d\mathcal{U}$		
,	MAP Estimate: 2 P(u/data) = 0 =	D 109 [P(M	uldata)]= 0
	log P(uldata) & Ze (xi-41)/200		1
	$\frac{\sum_{i} (x_{i} - \mu)^{2}}{2 \sqrt{t_{hve}^{2}}} + \frac{\mu}{2}$	u-10.5)2	
	∂ log P(μldoto) = Σ(χi-μ) + (10.5-μ) - 0		
	$\frac{\sigma_{\text{true}}^2}{\sigma_{\text{true}}^2}$		
	()		
	> mu + u= 10-5+ Zxi		
	O true O true		
	Mz 10.5+ Zxc		
	5 true		
	Ttrue		
	P(Mdatg) = P(data M) x(1/2)	$\rightarrow e^{-2I(x)}$	(-4) 1/2 - true
	JP(data/M)x 1/2d4		
	M 74.11		
2	るが、	_	
		Scanned by 6	CamScanner

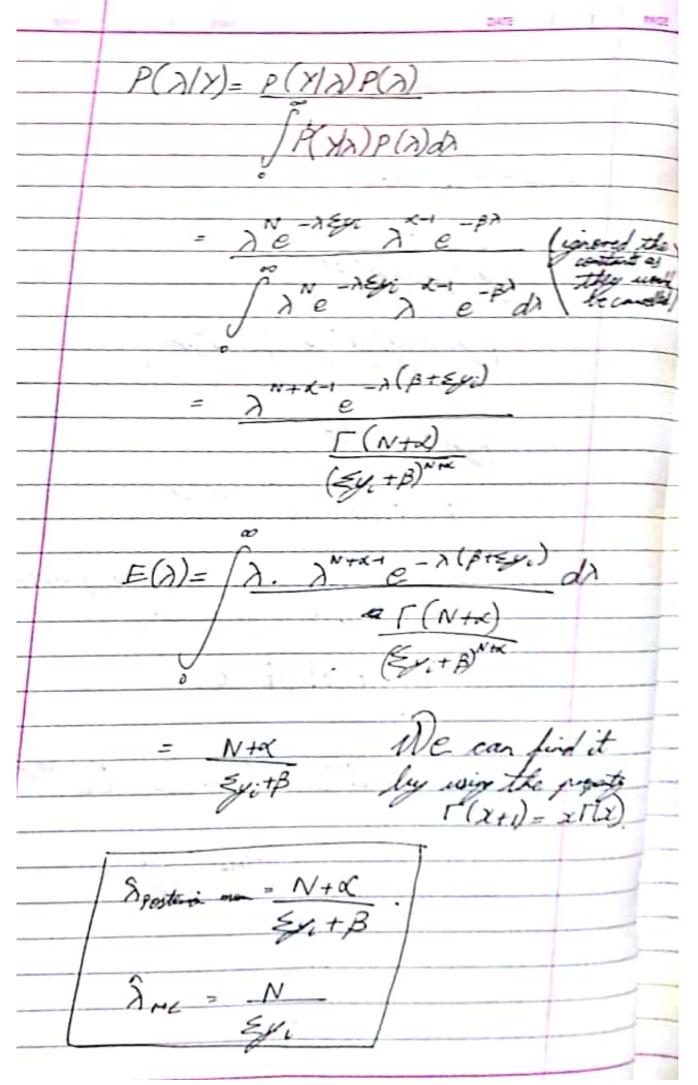
But since u has a uniterm prior in (9.5,11.5), and Likelihood function is parabolic, if α . α < 9.5, MAP estimate in (9.5,11.5) is 9.5 if α > 11.5, MAP estimate in (9.5,11.5) is 11.5 else MAP estimate is α .

As N increases, the relative error for all the three estimates of U converges to that of MLE estimate. And, Graussian prior boxplot has the minimum variance amongst all three estimate as The posterior which is is product of two Graussians, mean

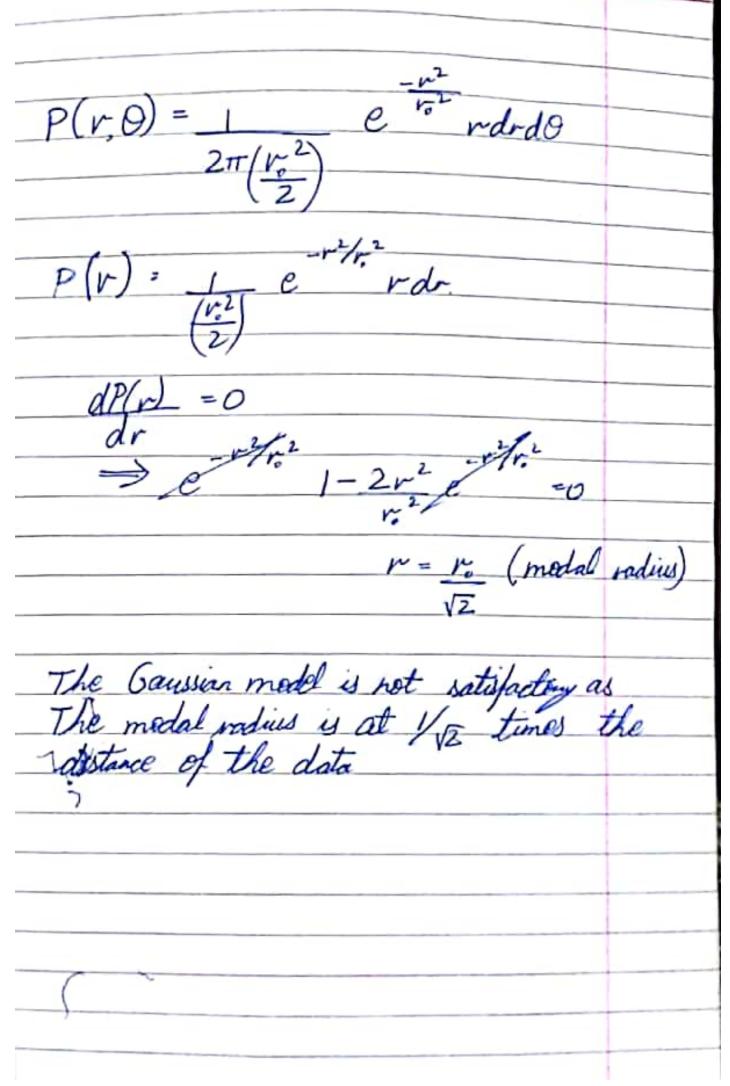
P)

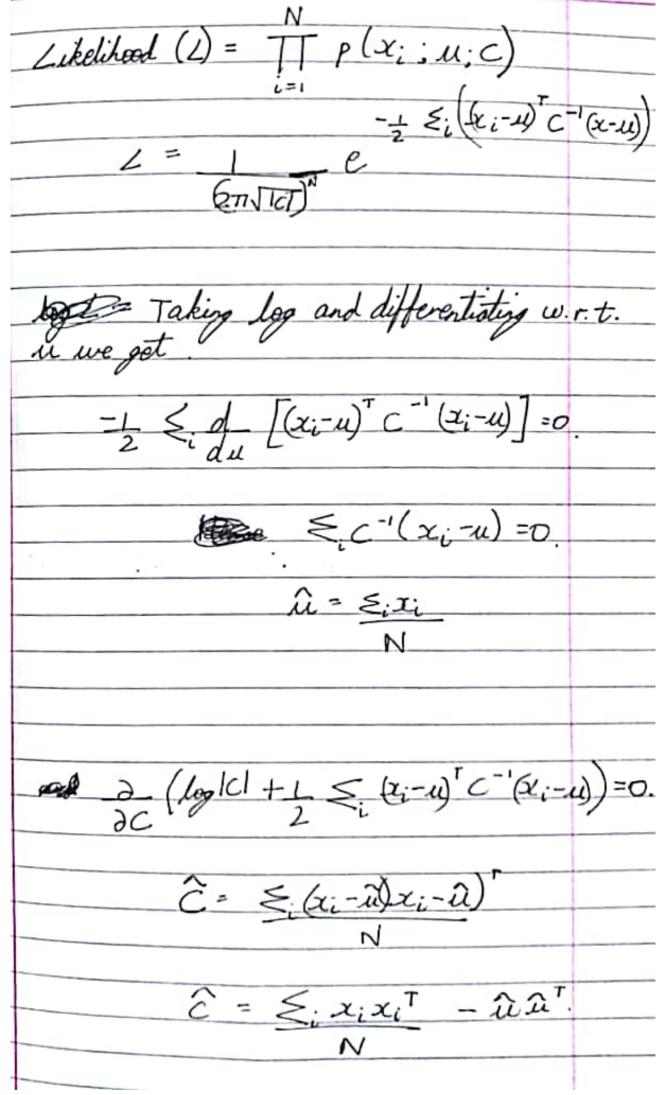
has $\sigma^{2*}(\text{variance}) = (\sigma^{2})(\sigma^{3}/n) < (\sigma^{3})[ML \text{ estimator}]$ Hence, Gaussian prior is preferable.



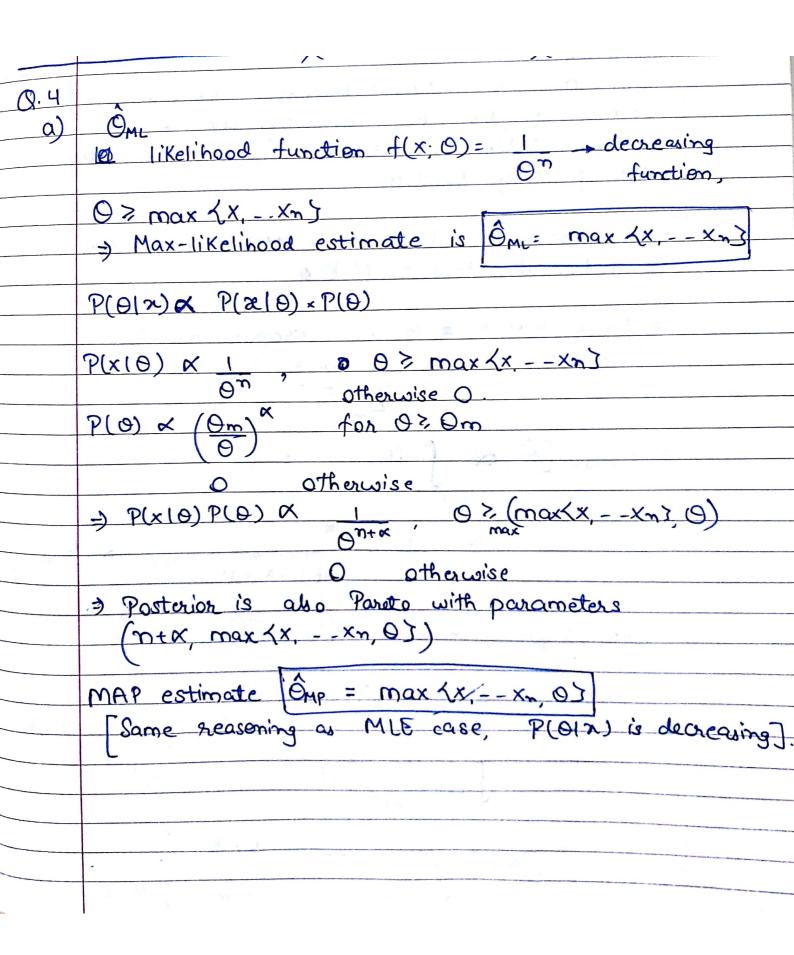


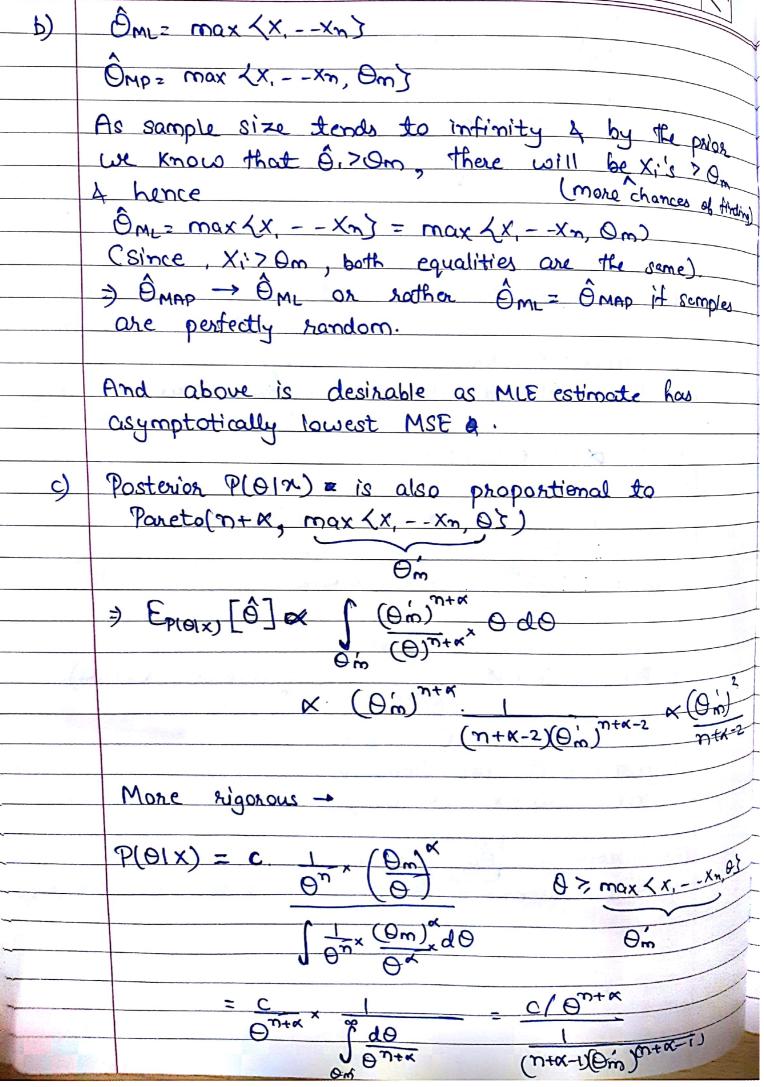
Pesterior men for mall N. M. LIE for loger The posterior mean estimate is more accumte for small N. As N increases MLE becomes nove efficient. P.M.E. Res Tends to M.L.E as N-200 and has less unione Posterior is more reducte for limited data, but as Nincreases wight of the liesed pria causes M.L.E. to be letter





Q. 3 c)	Yes. They match the theoretical values
<u> </u>	
	Cov = [.50007] Cthe = [.5 0]
	Cov = .50007 Cthe 2 [.5 0]
	û = [.0016] Utheos [0]
	0 0008 8000.
	N= 100000





Scanned by CamScanner