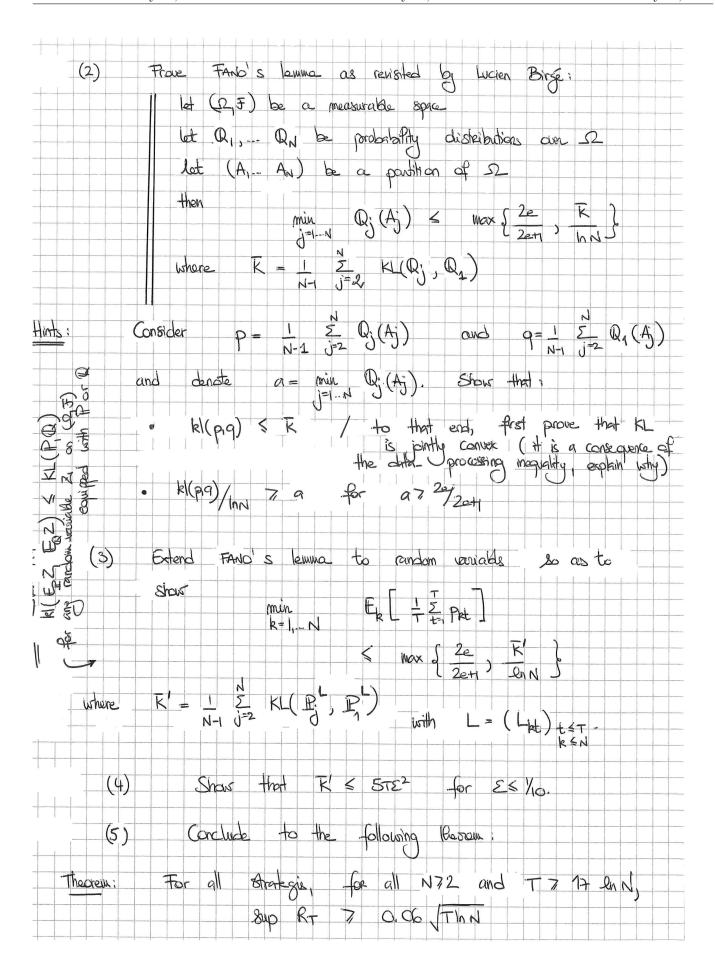


Exercice		lower bound_	, No	burn as: n-asymptotic lower bound)
It's a difficult Part of the difficult we will shody be be	exercise, try ulty cows from Ulties pr wer bounds	to do as much Re manipulation apostis in detail in for shockerstic bai	h as positive of kuller a few reliations	ossible. sch-Labler divogorus, weeks whom
Let Po be a	probability &	such that the la	oses L	t are id ~ B(1/2)
- Lpt ~	Ber (1/2) Ber (1/2-5)	th, th*	ted:	
(i) Show that	U	5 Pit Git - min TE max k=1,N		
		TO A NEW OBJE		
Recall that the Kulls ge and I equals: (KL well-defined as 213 210 2 is 7 - 1/e over (91	KL(J,u)	ivergence between 1 + 0 + 4 1 (dy In	is not ope	dutely continuous E [q +00]
KL has the following	proporties:		= (in all) d] # 3 « p
- KL(J@J") µ@µ".) = KL(7, ja) KL(35)) + KL(x), pi) (, px) < KL(x),	a) «~	by tubin. Totelli data compression inecuality we take it 0 for
We denote by &	Q(pq) = K	(Ber(p), Ber(q))		unted and will prove it
divergence between t	wo Bernaulli	p lu P + (1-7) distributions.	5) Qu 17 1-9	Re KL-



Convex	-functions	4	compani				wex vect	_
								pond ")
	, , ,	5 P3=1, W	, , , ,					ectors.
Setti	ing (nominal	દ્ય) :	A					
			1.	The simultar	Statistici necusty necisión	an and $p \in X$ $Q : X$	the opport	ent pick convex
			2.	le and	Pt are	reutaled		
s Regret:	R _T =	= 1 le(p)) -	inf pex	= lt(p)	to b	e controle liforum way	d in a
Fact:	Cons	x functions	are	Subdi (forentiable	on t	le interio	se of
	1 thoir	domain at	defin	nition:				
0 0 0	n let	f: & -	R	be con	ex, wher	e 80 C	Rn is	Convex:
- 2-2- - 2-2- - 2-2-		treD,						
- 12	<u>.</u>						≤ of _a .	(2-4)
£(2)	(x)	= 5 the set	of of					
د کو .		ndient of				123		
ľΩ		f is differen			+hen	Ej(2)	= { \forall f(2)	3.
Application		f R∈ Ž	(ie	Pit >	0 +5)	then	7 26 6	PE) C RN
-17	- 6	t tpe				t(p) ≤		· (Pt-P)
				7	(17)-	E(P)	o ECPE)	(t-+)
Example	i Me	eta- Statistics	d La	imensork:		l _t (p) =	(5 7) €	21 4, 2
		le	1	iferentiabe		1	(2 (5 F	5 6 a 1 B
					ith Gz			5 CO B7
Stratego	1;	Exponentiated		dients (with	learning 1	ate no
	1-					74211		7
	P1 = (1/4)	, ¼)	and			_	- 	

