Probability, Limit Theorems

Problem set 7. Due Nov 14, 2002

Q1. If X and Y are independent random variables show that for any $p > 0$

$$E[|X+Y|^p] < \infty \Leftrightarrow E[|X|^p] < \infty, E[|Y|^p] < \infty$$

Q2. Let μ be a probability distribution on the line. Let λ be the infinitely divisible distributiuon with characteristic function

$$\hat{\lambda}(\xi) = \exp[c \int (e^{i\xi\, x} - 1)\mu(dx)$$

for some $c > 0$. Prove that for any $p > 0$,

$$\int |x|^p d\mu(x) < \infty \Leftrightarrow \int |x|^p d\lambda(x) < \infty$$