0 14. (12 points) Consider two random variables, X and Y, and constants a and b.

(a) Use the definition of the covariance (that is, $\mathrm{Cov}(X,Y) = \mathbb{E}[X\,Y] - \mathbb{E}[X]\,\mathbb{E}[Y]$) to prove (mathematically) that $\mathrm{Corr}(a\,X, b\,Y) = \mathrm{Corr}(X,Y)$.

(b) Explain (with an example if you wish) why this is a desirable property of the correlation coefficient ρ.

(a) $cov(X,Y) = E[X,Y] - E[X]E[Y] \rightarrow Corr(aX,bY)$

$= corr(X,Y)$

$E[X,Y] = \sum_{x,y \in S}\sum (x,y) f(x,y)$

$E[X] = \mu_X$

$E[Y] = \mu_Y$