Homework

(1) Consider two assets with returns $R_1 \sim N(0.1, 0.2^2)$ and $R_2 \sim N(0.05, 0.1^2)$, and correlation $\rho = 0.3$. Assume the portfolio return is $R = w_1 R_1 + w_2 R_2$ with $w_1 + w_2 = 1$. Find the weights w_1, w_2 that minimize the portfolio variance $\mathrm{Var}(R)$.

(2) Suppose X and Y are perfectly correlated with correlation $\rho = 1$. Prove that Y is linearly related to X, i.e., there exist constants a, b such that $Y = aX + b$.