Covariance

Exercise 1. Properties of Covariance

Let X and Y be random variables such that X^2 and Y^2 are integrable. Now let $\mathrm{Var}(X) = 1$*, show that the quadratic deviation*

$$\mathbb{E}\Big((Y - (a + bX))^2\Big) \tag{$*$}$$

between Y and the affine function $a + bX$ is minimized for $b = \mathrm{Cov}(X, Y)$ and $a = \mathbb{E}(Y - bX)$. What does this mean for the case that X and Y are uncorrelated?
Hint: Resolve $(*)$ and take the partial derivatives with respect to a and b.