Exercise: The variance of a sum

(1 point possible)

The random variables $X_1, \ldots, X_8$ satisfy $\mathbf{E}[X_i] = 1$ and $\mathbf{var}(X_i) = 4$ for $i = 1, 2, \ldots, 8$. Also, for $i \neq j$, $\mathbf{E}[X_i X_j] = 3$. Then,

$\mathbf{var}(X_1 + \cdots + X_8) =$ 200 ✖ **Answer:** 144

Answer:
For $i \neq j$, we have
$\mathbf{cov}(X_i, X_j) = \mathbf{E}[X_i X_j] - \mathbf{E}[X_i] \cdot \mathbf{E}[X_j] = 3 - 1 = 2$. Thus,

$$\mathbf{var}(X_1 + \cdots + X_8) = 8 \cdot \mathbf{var}(X_1) + 56 \cdot \mathbf{cov}(X_1, X_2) = 32 + 112 = 144.$$

You have used 2 of 2 submissions