



Bookmarks

▸ General Information

▸ Week 1

▸ Week 2

▸ Week 3

▸ Week 4

▸ Week 5

▼ Week 6

LectureLecture questions due Oct 18,
2016 at 19:30 IST**Recitation****Problem Set 6**Homework 6 due Oct 18, 2016 at
19:30 IST

Week 6 > Lecture > Portfolio Optimization Model Exercise



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PART A

(1/1 point)

Suppose that X and Y are random variables, and $VAR(X) = 2.25 \times VAR(Y)$. Which one of the following is true:

☐ $SD(X) = SD(Y)$

☐ $SD(X) = (81/16) \times SD(Y)$

☒ $SD(X) = 1.5 \times SD(Y)$ ✓

☐ None of the above**SOLUTION**

$$SD(X) = 1.5 \times SD(Y).$$

This is because the standard deviation is the square root of the variance.

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PART B

(1/1 point)

Now suppose instead the objective was to maximize the expected return subject to an upper bound on the total variance of the portfolio, V_{MAX} .

Suppose further that returns from I, P, R are independent, and uncorrelated.

Which of the following is the correct constraint for the variance?

☐ $225I^2 + 324P^2 + 100R^2 + 300IP - 150IR + 120PR \geq V_{MAX}$

☐ $225I^2 + 324P^2 + 100R^2 = V_{MAX}$

☐ $-225I^2 - 324P^2 - 100R^2 + 300IP - 150IR + 120PR \geq V_{MAX}$

☐ $225I + 324P + 100R \leq V_{MAX}$

☒ $225I^2 + 324P^2 + 100R^2 \leq V_{MAX}$ ✓

EXPLANATION

Solution

The correct answer is:

$$225I^2 + 324P^2 + 100R^2 \leq V_{MAX}.$$

The left hand side of the constraint is due to the following fact. For independent random variables, the variance of the sum is equal to the sum of the variances.

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