**HOMEWORK 5**

*This homework is due on April 10th. It must be handwritten and handed in at the beginning of the lecture. No late homeworks will be accepted. Please show all your work to receive partial credit.*

**1)** A husband and wife are planning for retirement and they believe that a comparison over a five-year period would be appropriate. They are given the following information about one mutual fund that they are considering. Assume that all remaining assets under management are withdrawn by the family at the end of 5 years.

|  |  |  |
| --- | --- | --- |
| Year | Beginning Assets Under Management | Net Return (%) |
| 1 | 30 million | 10 |
| 2 | 40 million | -15% |
| 3 | 25 million | 8% |
| 4 | 25 million | 16% |
| 5 | 20 million | 9% |

a. Compute the arithmetic and geometric mean annual return for the fund.

b. What is the money-weighted annual return for the fund? You can calculate the annual cash flow (either additional investment or withdrawal by the couple) at year *t* as the difference between the beginning assets under management at year *t* and ending assets under management at year *t-1*.

**2)** Suppose the return for stocks A and B for the last six months have been the following:

|  |  |
| --- | --- |
| A | B |
| -2.20% | 5.00% |
| 4.50% | 9.20% |
| 6.80% | 4.30% |
| 1.20% | -10.60% |
| 7.30% | 8.40% |
| -0.50% | 3.80% |

a. What is the expected return, variance and standard deviation of the two stocks? What is the covariance and correlation among them?

b. What would the return and standard deviation of a portfolio that is 30% invested in stock A and 70% invested in stock B be?

**3)** Assume that you manage a risky portfolio with an expected rate of return of 13% and standard deviation of 22%. The risk-free rate rate on a Treasury-bill is 5%.

a. Your client chooses to invest 65% of a portfolio in your fund and 35% in a risk-free T-bill money market fund. What is the expected return and standard deviation of your client’s portfolio?

b. Suppose another investor decides to invest in your risky portfolio a proportion (w) of his total investment budget so that his overall portfolio will have an expected rate of return of 10%. What is the proportion w? What is the standard deviation of the rate of return on this client’s portfolio?