UNIVERSITY OF TEXAS AT AUSTIN

Quiz # 15

The tangent portfolio. Sharpe ratio.

Please, provide your **complete solutions** to the following problems. A graphical argument is acceptable.

Problem 15.1. (2 points) The tangent portfolio has the highest Sharpe ratio of all the portfolios in the feasible set. *True or false?*

Problem 15.2. (2 points) Consider our usual coordinate system of portoflios with the volatility on the horizontal axis and the expected return on the vertical axis. Consider a portfolio P in that plane and look at the line through that portfolio and the point corresponding to the risk-free asset $(0, r_f)$. Then, the slope of this line is exactly the Sharpe ratio of the portfolio P. *True or false?*

Problem 15.3. (2 points) Consider a portfolio P consisting of a collection of risky assets. You construct a new portfolio by investing a proportion ϕ of your wealth in portfolio P and the remainder of your wealth in the risk-free asset. Then, the excess return of the new portoflio is the same proportion ϕ of the excess return of the portfolio P. *True or false?*

Problem 15.4. (9 points) Assume that the risk-free interest rate equals 0.04. The Sharpe ratio of asset S is given to be $1/4$ while the Sharpe ratio of asset Q equals $1/3$. You know that the volatility of S is twice the volatility of Q. If you build an equally weighted portfolio with assets S and Q as its two components, the expected return of this portfolio will be 0.10. What is the expected return of S and what is the expected return of Q?