Key to 4:00 Quiz: 2/20/12

and Johnson & Johnson (JNJ), the covariance between the returns on these two stocks, and the standard deviation of returns you can expect if you invest $100,000 in Johnson & Johnson and $400,000 in Exxon Mobil. (Assume that these past returns are representative for both firms).

Year	Return on: XOM	JNJ
2011	+6%	+14%
2010	+29%	-2%
2009	-14%	+13%
2008	-9%	-6%

Note: You don't have to solve anything, just set everything up.

$$SD(R_{XOM}) = \sqrt{Var(R_{XOM})}$$

$$Var(R_{XOM}) = \frac{1}{3}((6 - \bar{R}_{XOM})^2 + (29 - \bar{R}_{XOM})^2 + (-14 - \bar{R}_{XOM})^2 + (-9 - \bar{R}_{XOM})^2)$$

$$\bar{R}_{XOM} = \frac{1}{4}(6 + 29 - 14 - 9)$$

$$SD(R_{JNJ}) = \sqrt{Var(R_{JNJ})}$$

$$Var(R_{JNJ}) = \frac{1}{3}\left((14 - \bar{R}_{JNJ})^2 + (-2 - \bar{R}_{JNJ})^2 + (13 - \bar{R}_{JNJ})^2 + (-6 - \bar{R}_{JNJ})^2\right)$$

$$\bar{R}_{JNJ} = \frac{1}{4}(14 - 2 + 13 - 6)$$

$$Cov(R_{XOM}, R_{JNJ}) = \frac{1}{3}\left((6 - \bar{R}_{XOM})(14 - \bar{R}_{JNJ}) + (29 - \bar{R}_{XOM})(-2 - \bar{R}_{JNJ}) + (-14 - \bar{R}_{XOM})(13 - \bar{R}_{JNJ}) + (-9 - \bar{R}_{XOM})(-6 - \bar{R}_{JNJ})\right)$$

$$Var(R_p) = \left(\frac{100,000}{500,000}\right)^2 Var(R_{XOM}) + \left(\frac{400,000}{500,000}\right)^2 Var(R_{JNJ}) + 2\left(\frac{100,000}{500,000}\right)\left(\frac{400,000}{500,000}\right) Cov(R_{XOM}, R_{JNJ})$$

$$SD(R_p) = \sqrt{Var(R_p)}$$