Ch. 10 – Examples

1. Based on the following probability distribution, what is the expected return and standard deviation of returns on JeeEee Light Bulbs Inc.?

Probability	Return
.15	0.35
.65	0.10
.20	-0.15

$$E(R) = .15 (.35) + .65 (.10) + .2 (-.15)$$

$$var(R) = .15 (.35 - E(R))^2 + .65(.1) - E(R))^2 + .2 (-.15 - E(R))$$

$$SD(R) = \sqrt{var(R)}$$

2. Given the following returns for Barnes & Noble (BKS) and the Standard & Poor's 500 (S&P500), calculate the standard deviation (volatility) of Barnes & Noble and the S&P500.

Return on:

Year	BKS	S&P500
1	-23%	-18%
2	40%	13%
3	13%	11%
4	50%	6%
5	1%	14%

$$\bar{R}_{BKS} = \frac{1}{5}(-23+40+13+50+1)$$

$$Var(R_{BKS}) = \frac{1}{4}((-23-\bar{R}_{BKS})^2 + (40-\bar{R}_{BKS})^2 + (13-\bar{R}_{BKS})^2 + (50-\bar{R}_{BKS})^2$$
$$+ (1-\bar{R}_{BKS})^2)$$

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

$$\bar{R}_{SP} = \frac{1}{5}(-18+13+11+6+14)$$

$$Var(R_{SP}) = \frac{1}{4}((-18-\bar{R}_{SP})^2 + (13-\bar{R}_{SP})^2 + (11-\bar{R}_{SP})^2 + (6-\bar{R}_{SP})^2 + (14-\bar{R}_{SP})^2)$$

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

3. Because production exceeds normal capacity at their existing facilities, Proctor Gambler Inc. is considering building an additional manufacturing site in Dallas. Since the new facility will use newly developed quality control techniques, Gambler estimates that production costs will be far more predictable than in the past. As a result, the standard deviation of returns on the new site will be 29% which is lower than the 35% standard deviation of returns on a new facility Gambler just finished building in Wisconsin and also lower than the 40% standard deviation of returns on the firm's other existing facilities. The beta of the new facility will be 1.1 compared to the 1.2 beta of the Wisconsin facility and the 1.4 beta of Gambler's other existing facilities. The new facility will be built on land that was purchased a year ago for $750,000 that could be sold today for an after-tax cash flow of $650,000. The new facility will require an investment of $3 million today and $2 million three months from today. Six months from today, the new facility will generate a net, after-tax cash flow of $13,000. After this initial cash flow, net monthly cash flows from the new facility will grow by 0.5% per month through 5 years from today (when the facility will be closed). <u>What rate should Gambler use when calculating the net present value of the monthly cash flows produced by the new factory if the risk-free rate is 4.5% per year and the market risk premium is 7.5% per year?</u>

$$r(1) = .045 + 1.1(.075)$$

$$r\left(\tfrac{1}{12}\right) = (1+r(1))^{1/12} - 1$$