

Economics 252 Problem Set #1.

1. An accident insurance company has reserves to cover claims on no more than 3 accidents. If all accidents have a probability of 0.01 of occurring, if all accidents are independent, and if the insurance company writes 100 policies, what is the probability that they will not have enough reserves?

2. Suppose the probability of a fatal plane crash is  $1/100,000$ , and all flights are independent of each other. You are considering a career as a pilot who will fly 100,000 flights in a lifetime. What is the probability that you will be killed in a crash?

3. Company X has had the following returns:

1998 25%  
1999 16%  
2000 15%  
2001 9%

Compute the arithmetic average return, the geometric average gross return, and the standard deviation of the returns

4. Suppose the aggregate stock market has the following returns:

1998 33%  
1999 24%  
2000 20%  
2001 15%

Compute the covariance coefficient of the market with company X, and the correlation coefficient as well.

5. Suppose that as a Yale graduate you can expect to earn \$150,000 per year on average from your job after taxes starting next year, and extending until you retire in 50 years. If the interest rate is 5% per year, what is the present value of your lifetime income?

6 The state lottery has accumulated an enormous pot, of \$100,000,000. The question then is how many bets to place (\$1 tickets to buy). There are 50,000,000 tickets for sale, and one and only one of these tickets will win the \$100,000,000 pot.

1. What is the expected value of the lottery ticket winnings for one ticket ?
2. Is this greater than the \$1 cost of the ticket?
3. Suppose you have logarithmic utility, *i. e.*, your utility is the log of your wealth after the lottery (your original wealth minus the cost of the tickets you buy plus the winnings). Use the value you computed in the previous problem for your original wealth. If you are an expected utility maximizer, how many tickets should you buy?