1. Here is a variation of the Monty Hall game. The contestant faces four doors. Behind one door is the prize. The other doors lead to empty rooms. The contestant chooses one door. The master of ceremonies then opens two doors that lead to empty rooms, but by rule he does not open the chosen door and he does not open the prize door. Now the contestant has an opportunity to switch her choice of doors.

A. In words, why is it best for the contestant to switch doors?

B. What is the probability of winning the prize if the contestant does not switch? What is the probability of winning the prize if the contestant does switch? Explain.

2. a. The formula for put-call parity is \( S + P = Xe^{-r(T-t)} + C \). Define puts and calls and show that at expiration the put-call parity relation holds by definition.

b. Suppose that at time \( T \) a stock will have a value either of 54 or 48 with equal probability. The safe discount rate is zero. The current price of the asset is 50. What is the value of a call on the stock with exercise price of 50?

What is the value of a put with the same expiration and exercise price? Show that put-call parity is not satisfied.

Construct the riskless arbitrage that allows a trader to profit from the situation.
3. Suppose that the board and top management of a publicly traded corporation have approved an announcement that the investor relations officer knows to be untrue. The announcement conceals serious losses incurred by the firm. What should the investment relations officer do? What will happen to his career after that?