8. a. Let the possible stock prices (per share) of a firm next period be given by:
96, 98,100, 102, 104, and suppose each of these 5 possibilities occurs with probability .2 The current price of a share is $100. If the cost of an option is its expected value, how much does it cost to buy 5000 options with strike price $101?

EV(option_101)= .2(0)+.2(0)+.2(0)+.2(1)+.2(3)=.8
So 5000 options cost .8(5000)=$4000

b. Suppose now that (unobservable) action V' yields stock price outcomes 80, 98, 100, 102, 141, each with probability .2. Would the firm prefer the manager to take this strategy over doing nothing? Calculate and explain.

"No action" strategy yields an expected stock value of
$EV(Stock_{no\ action})= .2(96)+.2(98)+.2(100)+.2(102)+.2(104)=\$100$
Action V' yields expected stock value of
$EV(Stock_{action\ V'})= .2(80)+.2(98)+.2(100)+.2(102)+.2(141)=\$104.2$

c. The manager is risk-averse and does not like the high-variance strategy. (He's worried that if the stock price falls to 80 he'll be fired.) Suppose you offer him 1000 options with strike price $101. What is the highest his disutility of taking action V' (in fear and effort cost, measured in dollars) could be, such that the 1000 options you offer him would still cause him to take action V' (or make him indifferent)?

$EV_{action\ V'}(option\_101)=.1(1)+.2(40)=.2+8=8.2$
So 1000 options are worth 8.2(1000)=$8200 to manager
If he does nothing, we have
$EV_{no\ action}(option\_101)= .8$ *from above.*
So 1000 options are worth .8(1000)=$800 to manager

Manager gains 8200-800=$7400 by taking action V' so his disutility from V' in effort cost and fear must be equivalent to no higher than $7400 for the 1000 options to induce him to take action V'