1. You have been offered theft insurance for your new bike, for which you paid $400. The insurance policy will cover you for one year. The premium is $20. You have a deductible of $80, so that if the bike is stolen you get a refund of $(400−80) = $320. According to actuarial figures for your area, the probability that a bicycle is stolen in any given year is 10%.

(a) Represent your decision problem by means of a decision tree. Note that insuring your bike is not a guarantee that it will not be stolen: it is only a guarantee of a refund in case it is stolen.

(b) Assuming that all you care about is your wealth (and prefer more wealth to less) and that you are risk neutral, find the optimal decision.

2. You have sued your employer for wrongful termination. They are offering a settlement of $70,000. The alternative is to go to trial, at a cost of $20,000. Your lawyer tells you that there are two possibilities: (1) you win, in which case you can expect an award of $100,000, or (2) you lose, in which case you get nothing. She thinks that there is a 60% chance that you will win.

(a) Represent your decision problem by means of a decision tree.

(b) Assuming that all you care about is your wealth (and prefer more wealth to less) and that you are risk neutral, find the optimal decision.

3. You have filed a law suit against your employer for sexual harassment. They have offered to settle for $40,000. The alternative is to go to trial, at a cost of $10,000. Your lawyer tells you that there are three possibilities: (1) you win big: $100,000, (2) you win small: $20,000 and (3) you lose and get nothing. She thinks that there is a 50% chance that you will win big and a 20% chance that you will lose.

(a) Represent your decision problem by means of a decision tree.

(b) Assuming that all you care about is your wealth (and prefer more wealth to less) and that you are risk neutral, find the optimal decision.
4. Your client, who wishes to build a restaurant, is trying to decide which of two parcels of land to buy. Parcel A has been offered at $300,000 and Parcel B at only $250,000. They seem equally attractive, so your client initially thinks that purchasing the cheaper one, Parcel B, is the way to go. However, in questioning the sellers about the parcels, you learn that Parcel B may have an environmental problem because wastes have been dumped on it, whereas no problems are associated with Parcel A. You find that if the wastes on Parcel B are hazardous, the law would require your client to clean up the site and that the cost of cleanup would be $200,000. You figure that the odds of Parcel B having this problem are 50%. But before your client decides which parcel to buy, you can hire an environmental testing firm to determine definitively whether your client would have to clean up Parcel B. Having the environmental firm do the testing would cost your client $20,000. Assume that your client is risk neutral.

(a) Represent your decision problem by means of a decision tree.

(b) Assuming that all your client cares about is his wealth (and prefers more wealth to less) and that he is risk neutral, should you advise your client to have the testing done? Or should he just buy Parcel A? Or Parcel B?