Take Home Midterm Exam

FIN 750
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Maximum score for each question is in brackets. Please, make your answers as short as you can

1. [20] Choose *any two* of the following statements. For each one you choose, say whether it is true or false. If true, give a brief argument explaining why it is true. If false, give a brief example where the statement can be seen to be false.

(a) [10] In a sequential move game, the first mover can always win.

(b) [10] If one player in a simultaneous-move game has a dominant strategy, then the outcome of the game will not change if this player is allowed to make the first move.

(c) [10] A repeated prisoners' dilemma will lead to a cooperative outcome so long as it is repeated more than 10 times.

2. [30] In a scene from *Manhattan Murder Mystery*, Woody Allen and Diane Keaton are at a hockey game in Madison Square Garden. She is obviously not enjoying herself, but he tells her: "Remember our deal. You stay here with me for the entire hockey game, and next week I'll come to the opera with you and stay until the end." Later, we see them coming out of the Metropolitan Opera House into a deserted Lincoln Center square while inside the music is still playing. Keaton is visibly upset: "What about our deal? I stayed to the end of the hockey game, and you were supposed to stay till the end of the opera." Allen answers: "You know I can't listen to too much Wagner. At the end of the first act, I already felt the urge to invade Poland." Comment on this scene from a strategic perspective.

3. [50] Suppose that a person owes $100 in taxes to the government. The person can either pay the $100 or cheat and pay nothing. The government can either audit this person or not audit him; the decision about whether to audit is made without knowing what choice the person made. If the government audits a person who picked Cheat, the tax evasion is discovered and the person must pay $150 to cover both his taxes and a fine imposed on detected cheaters. Auditing is costly; when the government audits a person, both the government and the person lose $10 (this cost must be paid regardless of whether the person chose Cheat or Pay). The payoffs in this non-constant-sum game are measured so that (for example) if the person chooses

Pay and the government chooses Not audit, the person's payoff equals 0 and the government's payoff equals 100.

(a) [10] Fill in the two missing numbers in the following payoff matrix.

		Government	
		Audit	Not
Person	Cheat	(-60, 140)	(, 0)
	Pay	(-10,)	(0,100)

(b) [10] Determine whether there is an equilibrium in pure strategies in this game.

(c) [10] Suppose that the government chooses Audit with probability q (and, obviously, chooses Not with probability $1 - q$). Determine the value at which q must be set to ensure that the person gets the same expected payoff from Cheat as he gets from Pay (this is equivalent to asking you to find the value of q that holds in a mixed-strategy equilibrium in this non-constant-sum game).

(d) [10] Suppose that the person feels (somewhat) guilty when he chooses Cheat. We will represent this feeling of guilt by saying that the person's payoff when he chooses Cheat (whether he is audited or not) falls by 20. In this case, at which value must q be set to ensure that the person gets the same expected payoff from Cheat as he gets from Pay?

(e) [10] Compare the outcomes from parts c and d. Bearing in mind the probability with which the government chooses Audit, would you expect to see any difference between the person's equilibrium behavior in part c and his equilibrium behavior in part d? If not, is there any benefit to society from the person's guilty conscience in part d?