FINAL EXAM

There are 180 points on the exam. Answer all five questions. On the mathematical parts, there will be credit for partial answers or insights, so explain what you are doing.

(1) **(40 points)** Economists sometimes take the view that a central bank's balance sheet is a fiction that should be ignored in analyzing monetary policy. But central bankers sometimes behave as if they are quite concerned about their balance sheets.
  (a) What is the argument for ignoring the balance sheet?
  (b) If monetary policy is thought of as charged with maintaining price stability, what is the argument, if any, for taking account of the balance sheet in determining monetary policy?
  (c) Does the state of a central bank's balance sheet affect its ability to exercise a lender-of-last-resort function? Under what conditions, if any, and why?

(2) **(30 points)** Historically, we find that sudden crashes in asset values are usually preceded by a period of high yields on those assets, either in the form of high interest rates or in the form of rapid increases in asset price. If in these episodes regulators had prevented the rapid rise in price or the high interest rates, the eventual level of asset prices and interest rates would be the same as if the high-hield period and subsequent crash had been allowed to run its course. Would it therefore be costless, in terms of economic efficiency, for regulators to intervene automatically when they spot an asset market where there has been a sustained period of much-above-normal yields, to prevent the booms that precede the busts? Explain your answer.

(3) **(70 points)** Suppose a corporation has been set up with rights to explore a certain geographic area in which there is an oil field. The oil is worth\$35 a barrel in the ground (that is, this is its market value, given consumer prices, the costs of refining, and the costs of extracting the oil). The corporation, and the market, does not know how much oil is in the field. The field is circular, and everyone knows there is oil at the center of the circle, where a test drill, showing oil, has been made. The diameter of the circle could be up to 50 miles. The field will contain 10,000 barrels of oil per square mile, whatever its radius. The company will each month drill one test well, starting at 10 miles from the center. If the test well shows oil, then it will drill another, next month, 10 miles farther from the center, until it reaches 40 miles from the center or until the test drill shows no oil, whichever comes first. If the well does not show oil, everyone knows that there is oil only out to the radius at which the last test well was drilled. (In particular, if the first test well, at 10 miles, shows no oil, there is a negligible amount of oil in the field). Once the radius of the field is known, the total value of the company's stock is just \$35 times the number of barrels in the field. Assuming investors are rational, that they believe that each radius — 0, 10, 20, 30, 40, and 50 — is equally probable, and that they insist on their investment in this company's stock earn the same expected return as is available on bonds, how will the company's stock value evolve from month to month in response to news about the test wells? Assume for simplicity that the monthly bond interest rate is zero. Show what your results imply for the monthly rates of return for investors in the stock. [Probably the best way to attack this problem is to work backwards. First figure out what the stock is worth if the 40-mile well shows oil and if it doesn't; then using that figure out what happens if the 30 mile well shows oil, and if it doesn't, etc.]

Suppose you thought the CEO of this company secretly knew the radius of the field. What pattern of purchases and sales of company stock would you look for in his portfolio if you were trying to detect insider trading? How would the pattern depend on what he knew the radius to be?

(4) **(15 points)** What is a margin account and why is it thought that regulations requiring higher margins help to insulate an asset market against crashes?

(5) **(25 points)** Goeree, Palfrey, Rogers and McKelvey show that in lab experiments where information cascade equilibria should emerge with perfectly rational agents, instead they seem to continually break up and recur. Describe what sort of deviation from perfectly rational behavior these authors suggest as explaining this breakup and recurrence. Explain why an information cascade equilibrium, if it occurred, would be a problem. Does the Goeree, Palfrey, Rogers and McKelvey paper show that cascade-like behavior is not a problem?