Final exam

Instructions: You have 120 minutes to complete this exam. Write your answers in the blue book provided to you. Credit, including partial credit, will depend principally on your explanations, so be sure to write thorough answers. Good luck!

1. (**8 points**) In January 1914, Henry Ford more than doubled the wage paid at his plant.

   True/false: this was most likely done because Ford was growing rapidly and needed to hire many additional workers, which would not have been possible at the old wage. Explain briefly.

2. (**5 points**) If my employer cannot clearly observe my effort at work, I might as well surf the Internet all day, as I get paid either way.

   True/false: the above is an example of *adverse selection*? Explain breifly.

3. (**7 points**) When you buy a new car, its resale value is at least 20% below what you paid for it *as soon as you drive it off the lot*. Explain why this might be using concepts developed in class.

4. (**15 points**) Consider a market with demand $Q = 20 - P$ supplied by two firms engaged in Bertrand price competition. That is, each firm simultaneously names a price, and then whichever firm names the lower price sells $20 - P$ units, and the firm naming the higher price sells 0. Assume both firms have a constant marginal cost of production equal to $5.

a. Under price competition, what price does firm 1 set in an equilibrium? Firm 2?

b. How much profit does firm 1 earn? Firm 2?

c. Suppose now that the two firms form a cartel and act as a monopolist. By how much would they be able to increase total profit? What would happen to price?

1

A   B

2   3

C   D   E   F   G

2, 9, 11

3, 4, 9   2   x, y, z   1, 7, 6

H   I

1   5, 5, 5

J   K

6, 1, 0

8, 12, 7
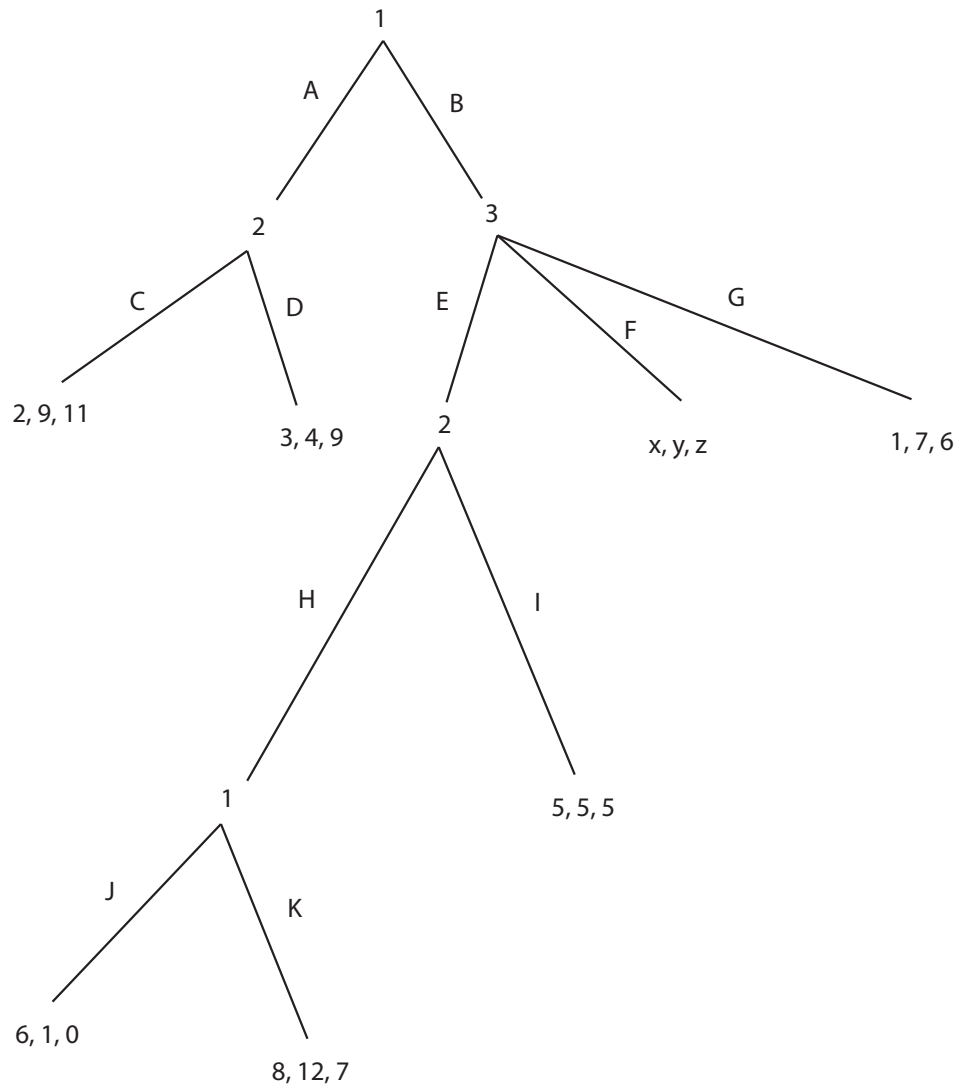
5. (**10 points**) Consider the game above. What must be true of x, y, and z for outcome F to be played in an equilibrium of this game? (Your answer should be of the form "x can be anything, y must be less than -17, and z must be a prime number")

6. (**10 points**) Chip is offered a lottery ticket that gives him nothing 75% of the time, and which gives him \$5 25% of the time. The ticket costs \$1. If Chip is risk averse, will he buy the ticket or not (or is it uncertain)? Explain.

7. (**15 points**) Elroy faces a 10% chance of something bad happening in the next year (i.e. getting fired, needing surgery, etc.). If the bad thing happens, Elroy's wealth will be 0. If not, his wealth will be $10,000. Elroy's utility function over wealth is $\sqrt{w}$.

a. Calculate Elroy's expected utility.

b. Suppose Mitt offers to sell Elroy an insurance policy that will pay Elroy $4,900 in the event something bad happens, but which will cost him $x if nothing happens. What is the most Elroy would be willing to pay for such a policy?

c. Suppose Mitt is risk neutral. Can Mitt profit from selling this policy to Elroy?

d. It is easy to insure against car accidents, house fires, or unexpected health care costs. It is hard to ensure against losing your job (to the extent there is insurance, it is provided by the government). What concept discussed in class does this phenomenon illustrate?

8. (**15 points**) Two Cournot quantity competitors face the following demand curve:

$$P = 9 - q_1 - q_2$$

to keep the problem simple, assume that both firms can produce at zero cost.

a. Solve for the Nash equilibrium. What are q_1 and q_2 in equilibrium, and how much profit does each firm earn?

b. Suppose firm 1 has the option of outsourcing 4.5 units of production at cost K, and producing nothing on its own (essentially, it is paying K to commit to producing 4.5 units). Firm 2 is aware of firm 1's outsourcing decision prior to its determining how much to produce itself. What is the maximum value of K for which outsourcing is a good idea for firm 1?

9. (**15 points**) An airline has two types of customers, tourists and business travelers. Tourists have demand function $p = 30 - q$, where q is the level of amenities (quality) for a purchased seat. Business travelers have demand $p = 40 - q$. Suppose that fraction $\frac{1}{10}$ of all travelers are business travelers, while $\frac{9}{10}$ are tourists.

  The airline chooses a quality level q. For simplicity, assume that there is no cost to the airline of setting a given quality level, or to taking on an additional passenger.

a. Suppose the airline is constrained to only be able to set one quality level throughout its planes. What quality level should it set, and what price should it charge for a ticket?

b. Now suppose the airline can set two quality levels in its plane, one for first class and one for coach. Go as far as you can in describing how the airline approaches setting quality levels in these two sections to maximize profit (the right pictures can get most of the points, though solve for the profit-maximizing quality levels and prices if possible).