1. [15] To operate a taxi in New York City, it is necessary to own a license, called a “taxi medallion.” There are a fixed number of medallions and an active resale market for them. They sell for about $600,000 each. In a taxi on the way from LaGuardia Airport into Manhattan, your cabbie, named Horatio, starts talking about the business. “I own my cab,” he says, “and I fully own the medallion as well. So I take home all the money I make. After paying for gas, insurance, and maintenance, I make about $300 in a day. That’s pure profit and more money than I could make working any other job.” Is Horatio’s analysis right? Why or why not.
The FIFO Café has noticed a decline in the number of students coming in for breakfast over the past month. They are debating changing their hours of operation and only serving lunch and dinner. They’ve called you in to advise them on their decision. They show you the following table: Monthly Accounting at FIFO’s, September 2008. [Numbers in parentheses represent negative amounts.]

<table>
<thead>
<tr>
<th>Hours of operation</th>
<th>Breakfast 7AM-11AM</th>
<th>Lunch 11AM-3PM</th>
<th>Dinner 3PM-7PM</th>
<th>Total 7AM-7PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meals served</td>
<td>2,400</td>
<td>6,400</td>
<td>3,000</td>
<td>11,800</td>
</tr>
<tr>
<td>Revenue</td>
<td>$7,200</td>
<td>$32,000</td>
<td>$15,000</td>
<td>$54,200</td>
</tr>
<tr>
<td>Food cost</td>
<td>$600</td>
<td>$8,000</td>
<td>$3,000</td>
<td>$11,600</td>
</tr>
<tr>
<td>Other direct costs*</td>
<td>$4,800</td>
<td>$9,600</td>
<td>$7,200</td>
<td>$21,600</td>
</tr>
<tr>
<td>Overhead**</td>
<td>$4,600</td>
<td>$4,600</td>
<td>$4,600</td>
<td>$13,800</td>
</tr>
<tr>
<td>Profit</td>
<td>($2,800)</td>
<td>$9,800</td>
<td>$200</td>
<td>$7,200</td>
</tr>
</tbody>
</table>

* Other direct costs include the wages of the counter and kitchen staff. All workers earn $15/hour. FIFO staffs 4 people between 7AM and 11AM, 8 people from 11AM 3PM and 6 from 3PM-7PM. FIFO is only open weekdays, or 20 days per month.

** Overhead includes the lease on the building, the manager’s salary, and licensing fees that they pay to Chez Panisse Restaurant, because Chez Panisse developed several of the FIFO recipes (including about half of the meals served at breakfast), FIFO must pay Chez Panisse $0.20 for each meal they serve using a Chez Panisse recipe. Overhead costs are allocated equally across Breakfast, Lunch and Dinner because FIFO is open 4 hours a day for each meal.

Should FIFO stop serving breakfast? If they do, by how much would their profits change? Explain you answer with respect to all the costs FIFO faces.
3. Your company makes Chardonnay wine and sells it in two markets. The taste for Chardonnay differs between the two markets and demand is substantially stronger in market A than in market B. In market A the weekly demand is $P_A = 100 - Q_A$ and in market B weekly demand is $P_B = 20 - Q_B$, where in both cases ($P$ is in dollars and $Q$ is in liters). Your marginal cost of making the wine is $4$ per liter, but you also have a weekly fixed cost of $200$ that must be paid at the beginning of each week. (A useful formula that you may want to know for some of the following questions is that the area of a triangle is $Area = \frac{1}{2} \cdot base \cdot height$.)

(a) [6] Consumers never travel between the two markets and no one except you is able to transport bottled wine between the markets, so you are able to set different prices in the two markets. What price do you set in each market and how much profit do you make per week?

(b) [8] The word gets out that you are charging different prices in the two markets and the population in market A is outraged. They get their legislator to pass a law against price discrimination in Chardonnay sales. What price do you now charge? How much does profit change from part (a)? How much does consumer surplus change in each of the markets?
(c) [8] The price discrimination law is found to violate the constitutional right to freedom of wine pricing and is no longer enforced. You go back to the prices you chose in part (a). But then one week your production is disrupted by a malfunction in your cartoning machine (which puts wine bottles in cartons). As a result, during this one week you produce 12 fewer bottles than you had been doing in part (a). What price do you set in each market during this week? (The price that you charge this week will not affect the demand you face in the future.)

4. You have two products that you can bring to the market. Tofu Smoothie is a new drink containing tofu, soy milk, frozen strawberries, and bananas. If you bring this to market and it catches on, you will be able to make $50,000 profit in the first year and then sell rights to the product to another company for $200,000 at the end of the year. If it doesn’t catch on, it will cost you $400,000 in the first year and then you will stop producing it. Your best estimate is that there is a 0.6 probability that the Tofu Smoothie catches on and a 0.4 probability that it doesn’t. (Your firm actually is a small division of a huge conglomerate and operates as a risk-neutral decision maker or expected-value maximizer.) The interest rate is 0%.

(a) [5] If this were the only product that the division is considering bringing to market, should the division do so?
The same sort of people who would buy a Tofu Smoothie (TS) would also buy a flaxseed-based breakfast cereal, Flaxseed 'n Fruit (F’nF). If the TS catches on, then you figure there is a 0.8 probability that F’nF also would catch on and 0.2 probability F’nF would fail. If the TS fails, then you figure there is a 0.3 probability that F’nF would catch on and 0.7 probability F’nF also would fail. (Note: Buying TS does not cause a person to want to buy F’nF. Rather, a person who likes TS is also likely to enjoy F’nF. A person’s enjoyment of one product is not affected by whether or not she has tasted the other.) If F’nF catches on, it will earn the division $300,000 in the first year of selling it and then the division will be able to sell the rights to produce this product for $600,000. If F’nF fails, it will cost the division $1.4 million in the first year and then will no longer be produced. Assume that the firm would first decide whether or not to introduce TS and would then consider introducing F’nF only after it had already introduced TS.

(b) [5] Draw the firm’s decision tree.

(c) [6] If TS fails, should the firm introduce F’nF?

(d) [6] If TS succeeds, should the firm introduce F’nF?

(e) [6] Should the firm introduce TS?
5. Packwood Consulting sells very specialized tax consulting services and faces no competition. The service is routine and the customers’ demands virtually identical. There are 100 customers, and each customer’s demand for Packwood’s services each year is \( Q = 100 - 10P \) (and each customer’s inverse demand is \( P = 10 - \frac{Q}{10} \), where \( Q \) represents hours of service and \( P \) the price per hour. It follows that \( P \cdot Q = 10Q - \frac{Q^2}{10} \). The derivative of this expression with respect to \( Q \) is \( 10 - \frac{Q}{5} \). Packwood can serve his customers at a marginal cost of $5 per hour. To enter this line of work Packwood had to spend $10,000 to get some special laws written, and he would like to recover this expense.

(a) [5] If Packwood Consulting charges a simple hourly price for consulting, what price will maximize his profits?

(b) [7] To fully exploit his monopoly position, Packwood now implements a two-part pricing scheme. What is the annual entry-fee or sign-up fee that Packwood should charge? What is the price per hour (after a customer pays the sign-up fee) should Packwood charge?

(c) [7] The government now wants to charge Packwood for the right to keep his monopoly. What is the most Packwood would be willing to pay each year?
(d) [8] Now Packwood notices that he also incurs a $20 set-up cost every time he takes on a new customer. If Packwood Consulting returned to charging a simple hourly price for consulting (with no sign-up fee) as in part (a), would the price that now maximizes his profits differ from your answer to part (a)? If so, by how much?

(e) [8] Instead Packwood decides to continue with a two-part pricing scheme after noticing the $20 set-up cost. Would the sign-up fee or price per hour that now maximizes his profits differ from your answer to part (b)? If so, by how much?

Please Sign Honor Code Oath: I understand that this exam is an individual effort exercise. I swear on my honor that I have not consulted with another person or made use of notes or other materials during the exam.

Signature: __________________________________________