1. (15 minutes)
a. Suppose that the aggregate market level marginal benefit (MB) curve for procedure XYZ in Boston is \( MB = 500 - \frac{Q}{20} \) where \( Q \) is the quantity of this procedure purchased in one year. The marginal cost of this procedure is $100. What is the socially correct quantity of this procedure to be purchased?

b. Suppose that all consumers are fully insured for this procedure. Assume that the marginal benefit curve for XYZ is also the demand curve. How much of this procedure will consumers demand? What is the annual welfare loss from this increase in quantity demanded?

c. Health care demand curves show the one-period demand. What are the implications of insurance in a dynamic setting where insurance might change the types of services offered in a market over time? What model might help you answer this question? **Topic not covered in 2006.**
2. (12 minutes) Suppose that Becky is offered a simple lottery in which a single die is rolled. If the die comes up 1, 2, 3 or 4 she wins $50, and if it comes up 5 or 6 she loses $70. Becky is just indifferent between taking this simple lottery and not taking it.
   a) What is the expected value of this lottery?

b) Can you tell from this information whether Becky is risk averse, risk neutral, or risk loving? Explain

c) What is the risk premium that Becky is being paid in order to accept this lottery? Show how you came up with this number.

3. (12 minutes) Internationally health care systems differ in many dimensions. For each characteristic shown, list one advantage and one disadvantage of each of the following dimensions of health care systems, and identify a country that has this characteristic. To get you started, answers to the first one are shown.

   **Topic not covered in same depth in 2006.**

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Characteristic and example country</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Controls Moral Hazard</strong></td>
<td>Medical Savings Accounts</td>
<td>Unfair to low income and unhealthy</td>
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<tr>
<td>Country: <strong>Singapore</strong></td>
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<tr>
<td>Employment based insurance</td>
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<td>Country:</td>
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<tr>
<td>Single payer system</td>
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<td>Country:</td>
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<td>Managed care</td>
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<td>Country:</td>
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<tr>
<td>Social Insurance</td>
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<td>Country:</td>
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4. (10 minutes) a) Suppose that there are only two goods, medical care (M) and food (F). The price of medical care and the price of food are both normalized to be one. John has a serious medical condition and an annual income of 10,000. In the absence of insurance, he is consuming 5000 units of medical care and 5000 units of food. Draw a budget constraint and set of indifference curves that is consistent with this initial situation.

b) Assume that John is offered a health insurance plan with a premium of $5000. This plan reduces the price of medical care so that he only needs to pay for 10 percent of the total cost. If John chooses this plan, he knows that he will prefer to consume 10,000 of medical care and 4,000 of food. Draw this new budget constraint and preferred consumption point on the same set of axes as in the above. Do you have enough information to decide whether John should buy insurance? Explain your answer.
5. (25 minutes) Assume that there are only three individuals in the market for health insurance, and these individual each get to choose between no insurance (NOINS), one Health Maintenance Organization (HMO) and one fee-for-service (FFS) health plan. Assume that the HMO and FFS both provide complete insurance (i.e., there is no cost sharing), but that the HMO manages care to keep health care spending down. With no insurance, each consumer must bear the full cost of all health care. The three people are A, B, and C. The value that they each attach to the NOINS, HMO and to the FFS plan, as well as their expected annual costs in each option, is shown below.

<table>
<thead>
<tr>
<th>Value of Choosing:</th>
<th>Expected Health Spending:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID    NOINS  HMO  FFS</td>
<td>NOINS  HMO  FFS</td>
</tr>
<tr>
<td>A     2,000  3,000  3,500</td>
<td>2000  2,600  3,000</td>
</tr>
<tr>
<td>B     5,000  8,000  10,000</td>
<td>5,000  6,000  7,000</td>
</tr>
<tr>
<td>C     8,000  11,000 15,000</td>
<td>8,000  10,000 11,000</td>
</tr>
</tbody>
</table>

a) What important economic concept explains why the average level of spending with no insurance differs from the level of spending under FFS insurance?

b) Assume that the HMO and FFS charge actuarially fair premiums and do not have any administrative costs or profit. At what price would the HMO just break even if it served all three people? At what price would the FFS plan just break even if it served all three people?

c) If the HMO and the FFS both offer to insure this group at the actuarially fair price for all three people that you just calculated, who will choose each of the three options (NOINS, HMO, FFS)? Calculate the profits to each plan.

c) Explain what will happen if the HMO charges a premium of $7,999 and the FFS charges a premium of 11,000.
6. (10 minutes) Suppose that in country Morovia (M) the marginal cost per prescription of a new drug named WONDER is $10 and the demand curve for the WONDER drug in M is given by the equation below. (Note that quantity demanded Q (number of prescriptions) is expressed as a function of demand price, P.)

a. Solve for the monopolists profit maximizing quantity and price for Morovia.

\[ Q = 1000 - 20P \]

b. Now suppose that the WONDER drug is universally covered by a government insurance program in M that pays for half of the cost of the drug. How does this affect the profit maximizing price for the monopolist to charge in M for this WONDER drug?
7. One good economic reason for not offering **full** insurance to consumers is
_________________________________________________________________________

8. One good economic reason for offering **full** insurance to consumers is
_________________________________________________________________________

Circle the best answer to each multiple choice question. (2 points each)

9. According to Ellis and McGuire (1986) hospitals that are prospectively paid imperfect agents will tend to do what?
   a. Offer more services than is socially optimal in order to increase their own profits.
   b. Attach too little weight to profits relative to patient benefits.
   c. Attach too much weight on patient benefits relative to the perfect agent.
   d. Be unwilling to treat high cost patients who are unprofitable.
   e. Have indifference curves between profits and quantity of care that are too flat relative to perfect agents.

10. According the Kenneth Arrow (1967), which of the following are **NOT** reasons why health care markets are different from other markets for goods and services.
   a. Demand for health care is irregular and highly unpredictable.
   b. Consumers are risk averse which creates a demand for health insurance.
   c. Health care receives preferential tax treatment which encourages the purchase of health insurance.
   d. Consumers cannot test the quality of medical services before consuming and hence rely on trust.
   e. Supply is noncompetitive, with restrictions on licensing and entry.

11. Which of the following markets is **NOT** discussed as being vulnerable to adverse selection in George Akerlof (1970) "The Market for Lemons"?
   a. Automobiles
   b. Health insurance
   c. Credit markets in developing countries
   d. Refrigerators
   e. Education and the schooling of minorities

12. Which of the following statements about HIV/AIDS is **NOT** true.
   a. Since 1996 AIDS has fallen from being the leading cause of death in the US among males aged 25-35 to being the fourth leading cause.
   b. Recent combinations of drugs that have cured AIDS have caused the death rate from AIDS to have declined dramatically.
   c. The average length of time from the time of infection with HIV to first symptoms of AIDS is reported on three medical web sites to be about ten years.
   d. Worldwide, a majority of infections from HIV is caused by heterosexual activity.
   e. The highest rates of HIV infections are in sub-Saharan Africa, where up to 50 percent of all adults (male and female) are infected.
13. Which of the following statements about social insurance programs in the US is true.
   a. The US Medicare program has more generous benefits than commercial insurance typically offered to workers under age 65, and hence the US elderly are more generously insured than most working people.
   b. The US Medicaid program offers benefits that are similar to those of people with commercial, employment based insurance.
   c. US Medicaid program covers the poor, the medically needy, pregnant women and children under age 18 uniformly throughout the US.
   d. Administrative costs of Medicare are low, only 2 percent of Medicare spending.
   e. Social insurance programs in the US now cover almost everyone and virtually everyone has some form of insurance coverage.

14. Which of the following statements about pharmaceuticals is true.
   a. Pharmaceutical drugs over the past decade have only earned profits that are comparable to a competitive industry.
   b. Compared to many other industries, pharmaceutical companies are not very competitive.
   c. If drug imports from Canada and Mexico are legalized, then we should expect drug prices to rapidly drop in the US.
   d. In many other countries, governments use their monopoly power to keep down the price of prescription drugs.
   e. In many other countries, governments use their monopsony power to keep down the price of drugs.