1. Your congressman, currently running for re-election, has a “zero-tolerance” for marijuana consumption, and vows to support laws reducing consumption to zero. Use economic analysis to help defeat this guy.

   Your congressman is not applying basic principle number 2: rational choice balances costs and benefits at the margin. The “optimal” amount of marijuana consumption is most likely not zero, since the cost of a law totally banning marijuana consumption (the lost value people get from consuming it) it is likely to be very high when very little is consumed. Thus, at zero consumption, marginal benefits would exceed marginal costs, so more than zero amounts of marijuana should be consumed (for resources to be allocated efficiently). Based on economic arguments alone, the congressman should be booted out of office. (There is a possible exception based on the assumption that consuming marijuana imposes external costs on people not consuming it; however, this would likely call for regulating marijuana, not eliminating it.)

   To be fair, the congressman could be arguing on non-economic grounds. There are two possibilities: 1) people don’t know what’s good for them; i.e. they are irrational; or 2) consuming marijuana is “bad”; i.e. the congressman is making a value judgment about other people’s preferences. Neither of these is consistent with the cost-benefit implications of economic analysis.

   (It is perfectly legitimate to propose policy based on value judgments. But economists qua economists typically don’t.)

2. Jessica has just arrived at the airport after a nine-hour flight. The cab ride to her hotel takes 10 minutes, while the airport shuttle (because of numerous stops) takes one hour. Cab fare is $30, while a ticket for the shuttle costs $5. Jessica’s best alternative to spending time in either the shuttle or the cab is sleep at the hotel, which she values at $36 over the next hour.

   a) Suppose that there is no wait for either the cab or the shuttle. What will Jessica likely choose to do?

   Consider the costs of each alternative: a) the cost of riding the cab is $30 (actually, $30 worth of stuff she could buy); b) the cost of riding the shuttle is $5 plus the cost of not sleeping for 50 minutes ($30=5/6 of 36). Since the cost of riding the shuttle is higher, Jessica’s optimal choice is to ride the cab. (Note that you will get the same answer if you consider the cost of the cab to be 30+6=36 and the cost of the shuttle to be 5 + 36=41. It is still $5 cheaper to ride the cab.)
b) Suppose the shuttle is ready but the line at the taxi stand implies a 10 minute wait. What is Jessica’s choice?

*Now the cost of the cab is $30 + $6 = $36, while the cost of the shuttle remains $35. Thus, the shuttle is now optimal.*

3. Draw a production possibility frontier for a hypothetical economy that produces only two goods (guns and butter), and assume that marginal opportunity costs of production are increasing. Draw points on the graph that make the following statements true:

*The PPF should have a negative slope, and should be concave to the origin (i.e. it should look like half an umbrella). This bowed shape reflects the assumption of increasing marginal costs.*

a) Point A is productively efficient.

*Any point on the frontier.*

b) At point B, the marginal cost of producing butter is lower than at point C.

*Suppose that butter is measured along the vertical axis, while guns are measured along the horizontal axis. Assuming both points B and C lie on the frontier, point B should lie below and to the right of point C.*

c) Point D might be attained if resources do not specialize in producing goods for which they have a comparative advantage.

*Point D will be a point inside the frontier, since production will be inefficient. If dairy farmers produce guns and gunsmiths produce butter, simply allowing them to switch jobs will increase total output (i.e. move the economy up to the frontier).*

d) Point E can be attained only if there is general economic growth or technological improvement.

*Point E will lie to the right and above the PPF, since economic growth or technological improvement will shift the frontier to the right.*
4. Consider the following production possibility frontiers for the U.S. and Japan.

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a) Are costs increasing on the margin?
No, marginal costs are constant in this example (if you plot these PPFs for each country, you will see that they are linear).

b) For each country, compute the opportunity costs of producing one car.
In the U.S., producing 100 extra cars requires giving up 200 tons of wheat. The cost of one extra car (the marginal car) is thus 2 tons of wheat. In Japan, producing 200 extra cars requires giving up 100 tons of wheat. The cost of one extra car is thus ½ ton of wheat. This is true no matter how many cars are produced (if marginal costs were increasing, the cost of cars would rise as more cars are produced).

c) Which country has a comparative advantage in producing cars? In producing wheat? Which country has an absolute advantage in producing cars? In producing wheat?
The US has an absolute advantage in producing wheat, since it can produce more wheat than Japan if only wheat is produced. Japan has an absolute advantage in producing cars (in this problem). Japan has a comparative advantage in cars, since it can produce cars at a lower marginal cost than the U.S.; the US has a comparative advantage in wheat. (The fact that each country has a comparative advantage and an absolute advantage in the same good is only coincidental.)

d) If each country specializes in production, is it possible for the US to consume 800 tons of wheat and 200 cars, at the same time that Japan consumes 200 tons of wheat and 600 cars, so that consumers in each country are better off? How can this happen?
Suppose the US economy produces 1000 tons of wheat (and no cars), while the Japanese economy produces 800 cars (and no wheat). Suppose also that car buyers in the US and wheat buyers in Japan agree to a “price” of cars of 1 ton
per car. Then the US could trade 200 tons of wheat for 200 cars, so that
consumers in the US consume 800 tons of wheat and 200 cars. The Japanese
receive 200 tons of wheat by trading 200 cars; they thus consume 200 tons of
wheat and 600 cars. Both are better off by trading as compared to not trading (for
example, without trade, Japan could consume 200 tons of wheat only if it were
willing to consume 400 cars).

5. Consider the following information about the market supply and demand for cases of
beer:

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<td>25</td>
<td>300</td>
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a) What is the equilibrium price of a case of beer?
   \$20, since at this price, quantity demand equals quantity supplied.

b) Suppose that the demand curve for beer above reflects willingness to pay if beer
can be purchased without waiting in line. In general, what happens to the demand
and price of beer if it takes an hour to buy beer?
   We know that rational consumers will demand beer until their marginal cost
equals their marginal benefit of buying beer. Since the marginal cost of buying
beer is the price plus the opportunity cost of waiting (the value of the consumer's
time), the demand curve will shift to the left and the price of beer will fall in
equilibrium. Or, if you want to think of only the price as the marginal cost, then
the net marginal benefit is the willingness to pay to consume the beer less the
value of time sacrificed to stand in line. In general, then, the demand curve shifts
to the left as wait time increases, causing the equilibrium price to fall.

c) Let’s be more precise. Suppose the opportunity cost to beer buyers of waiting in
line is \$10 an hour (i.e., buyers are willing to pay \$10 not to stand in line). What
is the new demand curve and equilibrium price?
   To be more precise, if there is no waiting in line, we know from the original
demand curve that consumers are willing to pay \$20 for 400 cases of beer, which
happens to be the original equilibrium. If there is a wait of an hour, costing \$10
per hour, consumers will be willing to pay only \$10 for 400 units (the marginal
value of consumption less the marginal cost of waiting). Or, if they must pay \$20
for a case, they are willing to buy only 200 cases of beer. (In this case, the total
cost is \$30, and from the table, you can infer that at \$30, 200 cases will be
demanded. Yet a more precise way of figuring this out is to write an equation for
the line representing the demand curve – slopes and intercepts and all that. I can
show you if you ask.) In effect, the demand curve shifts to the left by 200 cases at each price. The new equilibrium price is then $15 and quantity 300 cases.

6. In 1970, an economist compared water usage before and after the town of Boulder, Colorado installed water meters in homes and businesses. Before the meters were installed, the water utility company charged a flat monthly fee for water. With the meters, water consumers were charged for each unit of water used. What do you think he found? Why? What does this suggest about the slope of Boulder’s water demand curve?

As any economist would predict, he found that water usage fell after the meters were installed. With a flat fee, the marginal cost of water is zero (if you pay $30 per month for water no matter how much you use, the cost of the very next gallon consumed is zero). With a meter, the marginal cost is positive. People respond to incentives; in this case, the higher price provides the incentive for people to reduce consumption because of the higher marginal cost. (The actual findings of this study are given in the book by Miller et al., Chapter 6).