

**PROBLEM SET 1**

**DUE AT THE BEGINNING OF LECTURE ON TUESDAY, FEBRUARY 5<sup>TH</sup>**

You may work together on the problems, but your answers must be *in your own words* and *handwritten*. You also must *list the other students with whom you worked*.

For all questions be sure to explain your answers and to use graphs whenever appropriate.

1. This problem asks about opportunity costs in various situations.
  - a. It is the night before a statistics exam. You are dividing your time between studying for the exam and reading comic books. Each hour of studying will raise your score by 2 points, and reading a comic book takes 30 minutes. What is the opportunity cost of reading a comic book?
  - b. A piece of jewelry that you can order online costs \$200. What is the opportunity cost of the piece of jewelry?
  - c. You are in charge of dinner for you and your roommates. You can either buy the ingredients and make the meal from scratch, which would cost \$10 and take 2 hours, or you can order the meal, which would cost \$30 and take 2 minutes. Why would an economist say that the cost of the meal is not necessarily higher if you order it? Is the cost necessarily higher if you would use the time you would save in a pure leisure activity, such as playing video games?
  
2. Consider the PPC for the U.S. economy for civilian goods and services (such as food, education, and entertainment) and military goods and services (such as weapons). Both types of output are produced using capital (machines) and labor.
  - a. Draw the production possibilities curve (PPC) for the U.S. economy based on this categorization, with military goods and services on the horizontal axis and civilian goods and services on the vertical axis. Explain in words what the following represent: the point where the PPC intersects the vertical axis; the point where the PPC intersects the horizontal axis; the slope of the PPC at a given point. Why is the PPC for the U.S. economy likely to be bowed out?
  - b. Suppose that the aging of the population means that fewer people are available to work. How, if at all, would this development show up in the PPC diagram?
  - c. Suppose there is technological change that improves our ability to produce civilian output, but has no effect on the productivity of capital and labor in producing military output. How, if at all, would this development show up in the PPC diagram?
  - d. Suppose that an attack from outer space has two effects: it destroys many factories (making both military and civilian goods), and it causes us to shift our production so that the total production of military goods and services is higher than before the attack. How would this show up (if at all) in the PPC diagram?

3. Three friends, Giovanni, Luisa, and Maria, run a bakery in Rome. The bakery sells two items, biscotti and cannoli. Each worker works 6 hours per day. While all three can produce both items, they differ in the number of each they can produce in an hour. The following table shows the number of biscotti or cannoli each worker could produce in an hour.

	<u>Biscotti/Hour</u>	<u>Cannoli/Hour</u>
Giovanni	80	20
Luisa	30	50
Maria	40	30

- a. For each worker, what is the opportunity cost of 1 biscotto (in terms of cannoli)? Of 1 cannolo (in terms of biscotti)?
  - b. Draw the production possibilities curve (PPC), with cannoli on the horizontal axis, for the bakery (for a single day) when there is no specialization—that is, when each worker divides their time between biscotti production and cannoli production in the same way as the other two workers. Identify and explain the vertical intercept, the slope, and the horizontal intercept of the PPC in this case. Why does the PPC without specialization have the shape that it does?
  - c. Draw the PPC for the bakery when the three workers specialize according to comparative advantage. Again, identify and explain the vertical intercept, the slope(s), and the horizontal intercept of the PPC in this case. Also, give the quantities of cannoli and biscotti that correspond to any kinks in the PPC. Why does the PPC with specialization have the shape that it does?
4. Describe and show on a separate graph how each of the following developments would affect the market price and quantity of chocolate chip cookies.
- a. The end of conflicts in major cocoa-producing regions lowers the costs of producing cocoa, and so causes the price of cocoa (a major ingredient in chocolate) to fall.
  - b. Improvements in dairy farming lead the price of milk (which many people enjoy having with chocolate chip cookies) to fall.
  - c. In an effort to improve health, the government imposes a tax on chocolate chip cookies of 25 cents per cookie.
  - d. New studies suggest that chocolate has health benefits, **and**, at the same time, a drought in the Midwest causes the price of wheat (a major ingredient in flour) to rise.
5. Consider the market for child car safety seats.
- a. Do you think the price elasticity of demand for safety seats is likely to be fairly high or fairly low?
  - b. Suppose new discoveries cause the amounts of metal, plastic, and other inputs needed to produce a safety seat to fall. How would you expect this to affect the market price and quantity of safety seats? What would you expect to happen to total spending on safety seats?
  - c. Suppose many states pass laws increasing the maximum age at which children are required to be in safety seats. How would you expect this to affect the market price and quantity of safety seats? What would you expect to happen to total spending on safety seats?
  - d. Suppose the government imposes a binding price ceiling on safety seats. How would you expect this to affect the market price and quantity of safety seats? Will there be a shortage or a surplus of safety seats? What would you expect to happen to total spending on safety seats?