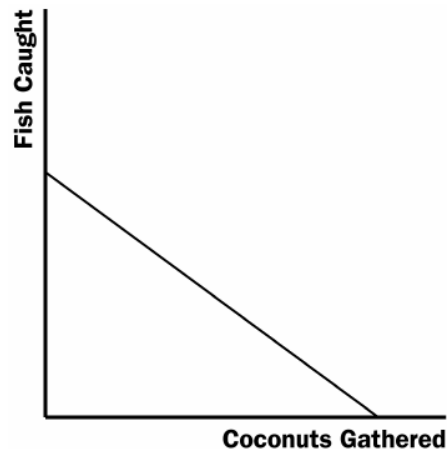


## **Chapter 3 Solutions to Practice Questions**

### **Quick Quizzes**

1. Figure 1 shows a production possibilities frontier for Robinson Crusoe between gathering coconuts and catching fish. If Crusoe lives by himself, this frontier limits his consumption of coconuts and fish, but if he can trade with natives on the island he will be able to consume at a point outside his production possibilities frontier.



**Figure 1**

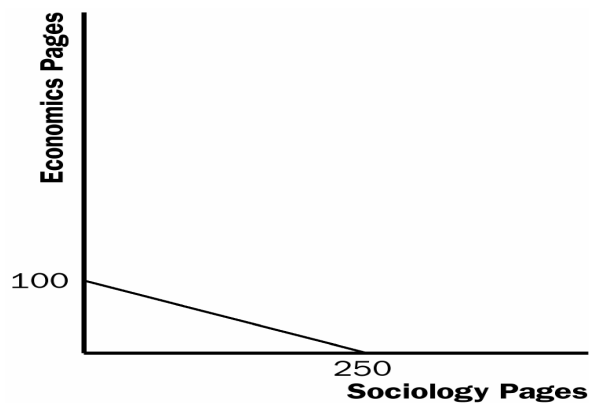
2. Crusoe's opportunity cost of catching one fish is 10 coconuts, since he can gather 10 coconuts in the same amount of time it takes to catch one fish. Friday's opportunity cost of catching one fish is 15 coconuts, since he can gather 30 coconuts in the same amount of time it takes to catch two fish. Friday has an absolute advantage in catching fish, since he can catch two per hour, while Crusoe can only catch one per hour. But Crusoe has a comparative advantage in catching fish, since his opportunity cost of catching a fish is less than Friday's.
3. If the world's fastest typist happens to be trained in brain surgery, he should hire a secretary. He has an absolute advantage in typing, but a comparative advantage in brain surgery, since his opportunity cost in brain surgery is low compared to the opportunity cost for other people.

### **Questions for Review**

1. Absolute advantage reflects a comparison of the productivity of one person, firm, or nation to that of another, while comparative advantage is based on the relative opportunity costs of the persons, firms, or nations. While a person, firm, or nation may have an absolute advantage in producing every good, they can't have a comparative advantage in every good.
4. A nation will export goods for which it has a comparative advantage because it has a smaller opportunity cost of producing those goods. As a result, citizens of all nations are able to consume quantities of goods that are outside their production possibilities frontiers.
5. Economists oppose policies that restrict trade among nations because trade allows all countries to achieve greater prosperity by allowing them to receive the gains from comparative advantage. Restrictions on trade hurt all countries.

## Problems and Applications

1. In the text example of the farmer and the rancher, the farmer's opportunity cost of producing one kilogram of meat is 4 kilograms of potatoes because for every 8 hours of work, he can produce 8 kilograms of meat or 32 kilograms of potatoes. With limited time at his disposal, producing a kilogram of meat means he gives up the opportunity to produce 4 kilograms of potatoes. Similarly, the rancher's opportunity cost of producing one kilogram of meat is 2 kilograms of potatoes because for every 8 hours of work, she can produce 24 kilograms of meat or 48 kilograms of potatoes. With limited time at her disposal, producing a kilogram of meat means she gives up the opportunity to produce 2 kilograms of potatoes.
2. a. See Figure 2. If Maria spends all five hours studying economics, she can read 100 pages, so that is the vertical intercept of the production possibilities frontier. If she spends all five hours studying sociology, she can read 250 pages, so that is the horizontal intercept. The time costs are constant, so the production possibilities frontier is a straight line.



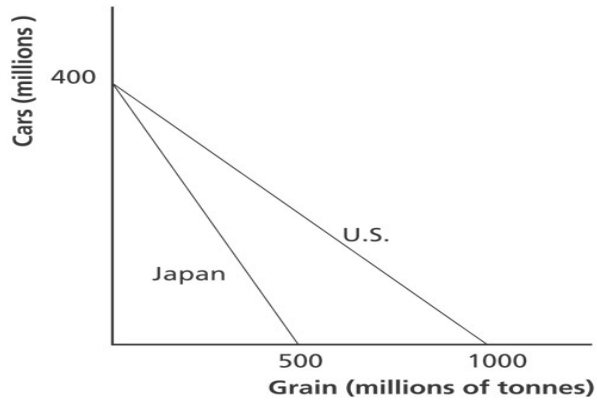
**Figure 2**

- b. It takes Maria two hours to read 100 pages of sociology. In that time, she could read 40 pages of economics. So the opportunity cost of 100 pages of sociology is 40 pages of economics.

3. a.

	Output per year	
	Cars	Grain
Canada	400 M	1,000 M tonnes
Japan	400 M	500 M tonnes

- b. See Figure 3. With 100 million workers and four cars per worker, if either economy were devoted completely to cars, it could make 400 million cars. Since a Canadian worker can produce 10 tonnes of grain, if Canada produced only grain it would produce 1,000 million tonnes. Since a Japanese worker can produce 5 tonnes of grain, if Japan produced only grain it would produce 500 million tonnes. These are the intercepts of the production possibilities frontiers shown in the figure. Note that since the tradeoff between cars and grain is constant (assumes resources are equally suited to producing both goods – no specialized resources), the production possibilities frontier is a straight line.



**Figure 3**

- c. Since a Canadian worker produces either 4 cars or 10 tonnes of grain, the opportunity cost of 1 car is  $2\frac{1}{2}$  tonnes of grain, which is 10 divided by 4. Since a Japanese worker produces either 4 cars or 5 tonnes of grain, the opportunity cost of 1 car is  $1\frac{1}{4}$  tonnes of grain, which is 5 divided by 4. Similarly, the Canadian opportunity cost of 1 tonne of grain is  $\frac{2}{5}$  car (4 divided by 10) and the Japanese opportunity cost of 1 tonne of grain is  $\frac{4}{5}$  car (4 divided by 5). This gives the following table:

	<b>Opportunity Cost of:</b>	
	<b>1 Car (in terms of tonnes of grain given up)</b>	<b>1 Tonne of Grain (in terms of cars given up)</b>
Canada	$2\frac{1}{2}$	$\frac{2}{5}$
Japan	$1\frac{1}{4}$	$\frac{4}{5}$

- d. Neither country has an absolute advantage in producing cars, since they're equally productive (the same output per worker); Canada has an absolute advantage in producing grain, since it is more productive (greater output per worker).
- e. Japan has a comparative advantage in producing cars, since it has a lower opportunity cost in terms of grain given up. Canada has a comparative advantage in producing grain, since it has a lower opportunity cost in terms of cars given up.
- f. With half the workers in each country producing each of the goods, Canada would produce 200 million cars (that is 50 million workers times 4 cars each) and 500 million tonnes of grain (50 million workers times 10 tonnes each). Japan would produce 200 million cars (50 million workers times 4 cars each) and 250 million tonnes of grain (50 million workers times 5 tonnes each).
- g. From any situation with no trade, in which each country is producing some cars and some grain, suppose Canada changed 1 worker from producing cars to producing grain. That worker would produce 4 fewer cars and 10 additional tonnes of grain. Then suppose Canada offers to trade 7 tonnes of grain to Japan for 4 cars. Canada will do this because it values 4 cars at 10 tonnes of grain, so it will be better off if the trade goes through. Suppose Japan changes 1 worker from producing grain to producing cars. That worker would produce 4 more cars and 5 fewer tonnes of grain. Japan will take the trade because it values 4 cars at 5 tonnes of grain, so it will be better off. With the trade and the change of 1 worker in both Canada and Japan, each country gets the same amount of cars as before and both get additional tonnes of grain (3 for Canada and 2 for Japan). Thus by trading and changing their production, both countries are better off.

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6. Though the professor could do both writing and data collection faster than the student (that is, he has an absolute advantage in both), his time is limited. If the professor's comparative advantage is in writing, it makes sense for him to pay a student to collect the data, since that is the student's comparative advantage.
7. a. English workers have an absolute advantage over Scottish workers in producing scones, since English workers produce more scones per hour (50 vs. 40). Scottish workers have an absolute advantage over English workers in producing sweaters, since Scottish workers produce more sweaters per hour (2 vs. 1). Comparative advantage runs the same way. English workers, who have an opportunity cost of  $1/50$  sweater per scone (1 sweater per hour divided by 50 scones per hour), have a comparative advantage in scone production over Scottish workers, who have an opportunity cost of  $1/20$  sweater per scone (2 sweaters per hour divided by 40 scones per hour). Scottish workers, who have an opportunity cost of 20 scones per sweater (40 scones per hour divided by 2 sweaters per hour), have a comparative advantage in sweater production over English workers, who have an opportunity cost of 50 scones per sweater (50 scones per hour divided by 1 sweater per hour).
- b. If England and Scotland decide to trade, Scotland will produce sweaters and trade them for scones produced in England. A trade with a price between 20 and 50 scones per sweater will benefit both countries, as they'll be getting the traded good at a lower price than their opportunity cost of producing the good in their own country.
- c. Even if a Scottish worker produced just one sweater per hour, the countries would still gain from trade, because Scotland would still have a comparative advantage in producing sweaters. Its opportunity cost for sweaters would be higher than before (40 scones per sweater, instead of 20 scones per sweater before). But there are still gains from trade since England has a higher opportunity cost (50 scones per sweater).
8. a. Price refers to opportunity cost i.e. how many units of the other good must be given up. See the table below.

	Opportunity Cost of 1 Red Sweater	Opportunity Cost of 1 Blue Sweater
Montreal	1 blue sweater	1 red sweater
Toronto	$\frac{1}{2}$ blue sweater	2 red sweaters

- b. Montreal has an absolute advantage in the production of both colours of sweater, since a worker in Montreal produces more of each per hour than a worker in Toronto.

Toronto has a comparative advantage in producing red sweaters, since the opportunity cost of producing a red sweater in Toronto is  $\frac{1}{2}$  blue sweater, while the opportunity cost of producing a red sweater in Montreal is 1 blue sweater. Montreal has a comparative advantage in producing blue sweaters, since the opportunity cost of producing a blue sweater in Montreal is 1 red sweater, while the opportunity cost of producing a blue sweater in Toronto is 2 red sweaters.

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- c. If they trade sweaters Montreal will produce blue sweaters for export since it has the comparative advantage in blue sweaters, while Toronto produces red sweaters for export which is Toronto's comparative advantage.
  - d. Trade can occur at any price between the opportunity costs of the 2 producers. The price of a blue sweater will lie somewhere between 1 red sweater and 2 red sweaters. That is, a blue sweater will end up trading for more than 1 red sweater but for less than 2 red sweaters.

**1 red sweater < Price of 1 blue sweater < 2 red sweaters**

Montreal will not trade a blue sweater unless it receives more than 1 red sweater in return, as this is Montreal's opportunity cost of producing a red sweater. And Toronto will not pay more than 2 red sweaters for each blue sweater since it would be better off producing its own blue sweaters as it would only have to give up 2 red sweaters.

The price of a red sweater will lie somewhere between  $\frac{1}{2}$  blue sweater and 1 blue sweater. That is, a red sweater will end up trading for more than  $\frac{1}{2}$  of a blue sweater, but less than 1 blue sweater.

**$\frac{1}{2}$  blue sweater < Price of 1 red sweater < 1 blue sweaters**

Toronto will not trade a red sweater unless it receives more than  $\frac{1}{2}$  blue sweater in return, and Montreal will not pay more than 1 blue sweater for each red sweater. If the asking price for a red sweater was greater than 1 blue sweater, Montreal would be better off to produce it themselves since they would only need to give up 1 blue sweater. And Toronto would be worse off if it was to sell a red sweater for less than what it cost them to make that sweater.

A good will not sell for less than the opportunity cost of making it in the exporting country, nor will it sell for more than the opportunity cost of making it in the importing country.

- 10.
  - a. True; two countries can achieve gains from trade even if one of the countries has an absolute advantage in the production of all goods. All that's necessary is that each country have a comparative advantage in some good.
  - b. False; it is not true that some people have a comparative advantage in everything they do. In fact, no one can have a comparative advantage in everything. Comparative advantage reflects the opportunity cost of one good or activity in terms of another. If you have a comparative advantage in one thing, you must have a comparative disadvantage in the other thing.
  - c. False; it is not true that if a trade is good for one person, it can't be good for the other one. Trades can and do benefit both sides—especially trades based on comparative advantage. If both sides didn't benefit, trades would never occur.