53. Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

Assume both Atlantis and Zanadu produce helmets and baseballs. Using equal amounts of resources, Atlantis can produce 100 helmets or 200 baseballs, whereas Zanadu can produce 100 helmets or 400 baseballs.

(a) Assume both Atlantis and Zanadu experience constant opportunity costs in producing helmets and baseballs. Draw a correctly labeled graph illustrating the production possibilities curves (PPCs) for Atlantis and Zanadu, showing helmets on the horizontal axis and baseballs on the vertical axis. Plot the numerical values provided above on your graph.

(b) Calculate the opportunity cost of one helmet for Atlantis. Show your work.

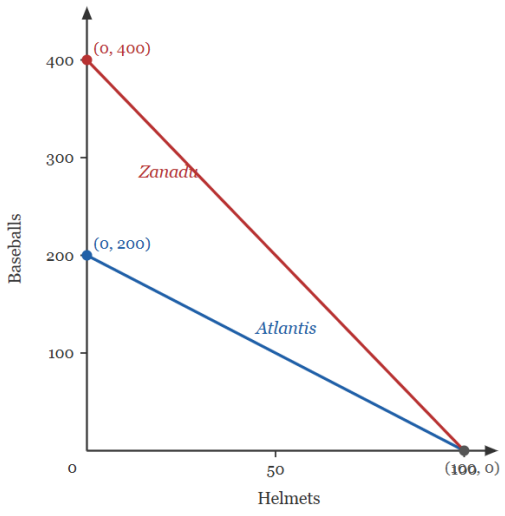
(c) Which country has an absolute advantage in the production of baseballs?

(d) Which country has a comparative advantage in the production of baseballs? Explain.

(e) If Atlantis and Zanadu specialize based on comparative advantage and trade, would they be able to gain from trade if the terms of trade are 1 helmet for 3 baseballs? Explain.

Respond to all parts of the question.

(a) PPC Graph



Constant opportunity costs → **straight lines** (not curved).

- **X-axis:** Helmets | **Y-axis:** Baseballs
- **Atlantis:** line from (0, 200) down to (100, 0)
- **Zanadu:** line from (0, 400) down to (100, 0)

Both share the same helmet intercept (100) but Zanadu's baseball intercept is twice as high. The two lines form a "V" shape opening to the left, sharing the point (100, 0).

(b) OC of One Helmet for Atlantis

OC of 1 helmet = baseballs given up ÷ helmets gained

= 200 ÷ 100 = 2 baseballs

To produce one more helmet, Atlantis must sacrifice 2 baseballs.

(c) Absolute Advantage in Baseballs

Zanadu — with the same resources, Zanadu produces **400 baseballs** vs. Atlantis's **200**. Zanadu is simply more productive at making baseballs in absolute terms.

(d) Comparative Advantage in Baseballs

Calculate the OC of 1 baseball for each country:

Country	OC of 1 baseball
Atlantis	100 ÷ 200 = **0.5 helmets**
Zanadu	100 ÷ 400 = **0.25 helmets**

Zanadu has comparative advantage in baseballs because it gives up only **0.25 helmets** per baseball, which is less than Atlantis's 0.5. Lower opportunity cost = comparative advantage.

This also means **Atlantis** has comparative advantage in helmets (0.5 baseballs per helmet vs. Zanadu's 4 baseballs per helmet — Atlantis is much cheaper).

(e) Terms of Trade: 1 Helmet for 3 Baseballs?

For trade to benefit both countries, the terms of trade must fall **between** each country's domestic opportunity cost of helmets:

Country OC of 1 helmet (domestic)

Atlantis 2 baseballs

Zanadu 4 baseballs

The terms of trade must be **between 2 and 4 baseballs per helmet.**

3 baseballs per helmet falls between 2 and 4 → YES, both gain.

- **Atlantis** gets 3 baseballs per helmet traded — better than producing baseballs domestically (which costs 2 baseballs worth of helmets). It receives more than it gives up. ✓
- **Zanadu** gives up only 3 baseballs per helmet received — better than making helmets domestically (which costs 4 baseballs). It pays less than domestic cost. ✓

Both countries are better off specializing and trading at these terms.

54. *I*nclude correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The data provided below describe an ice-cream store's daily production possibilities for milkshakes and sundaes.

Milkshakes	0	20	40	60	80	100	120
Sundaes	210	200	180	150	110	60	0

(a) Draw a correctly labeled graph of the store's production possibilities curve (PPC) with milkshakes on the horizontal axis and sundaes on the vertical axis and label the endpoints using the numbers provided above.

(b) Is the opportunity cost of producing milkshakes increasing, decreasing, or constant? Explain using numbers in the table.

(c) The store is currently producing 80 milkshakes and 110 sundaes. Calculate the opportunity cost of increasing milkshake production from 80 to 100 milkshakes. Show your work.

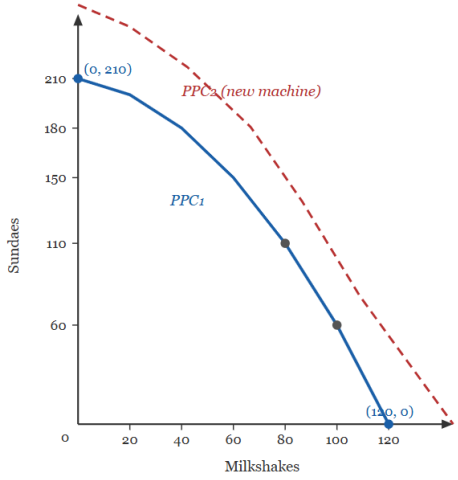
(d) Would it be efficient for the store to produce 80 milkshakes and 150 sundaes? Explain using numbers in the table.

(e) Suppose the ice-cream store purchases a new machine that increases the output of milkshakes and sundaes. Show the effect of the change on the store's PPC on your graph in part (a).

Respond to all parts of the question.

(a) Graph

The curve bows **outward** (concave to the origin) because opportunity costs are increasing. Endpoints are labeled (0, 210) and (120, 0). The dashed red curve is for part (e).



(b) Is OC of milkshakes increasing, decreasing, or constant?

Increasing. Calculate sundaes given up per 20 milkshakes at each step:

Milkshakes	Sundaes lost	OC per milkshake
0 → 20	210−200 = 10	10/20 = **0.5**
20 → 40	200−180 = 20	20/20 = **1.0**
40 → 60	180−150 = 30	30/20 = **1.5**
60 → 80	150−110 = 40	40/20 = **2.0**
80 → 100	110−60 = 50	50/20 = **2.5**
100 → 120	60−0 = 60	60/20 = **3.0**

Each additional batch of milkshakes costs more sundaes than the last → OC is rising → that's why the PPC bows outward.

(c) OC of increasing from 80 to 100 milkshakes

At 80 milkshakes → 110 sundaes
At 100 milkshakes → 60 sundaes

Sundaes given up = 110 − 60 = 50
Milkshakes gained = 100 − 80 = 20

OC = 50 ÷ 20 = 2.5 sundaes per milkshake

(d) Efficient to produce 80 milkshakes and 150 sundaes?

No — it's infeasible (impossible), not just inefficient.

The table shows that at 80 milkshakes, the store can produce a *maximum* of 110 sundaes. Producing 150 sundaes at the same time would require more resources than the store has. The point (80, 150) lies **outside** the PPC — above and to the right of it. You'd need to drop to 60 milkshakes to produce 150 sundaes.

(e) New machine increases both outputs

The entire PPC **shifts outward** — both intercepts increase. This is shown as the dashed red curve (PPC_2) on the graph. Every combination of milkshakes and sundaes expands because the machine boosts total productive capacity, not just one good.