PROBLEM SET #1 Suggested Solutions

1. (2 points total; 1 point per part) Positive vs. Normative, Sources of Disagreement

You are an education policy analyst. (That's one type of job you can get with an economics degree. Any job with the title 'analyst' is likely a job that an econ major is well prepared for.) A client asks you if a policy that will decrease class sizes in grades K-6 is a good plan.

A. Is your client's question a positive or normative question?

This is a normative question because it is asking you to make a judgment about whether a policy is good (or, implicitly, bad).

Of course, once a goal is specified, then the question changes and becomes a positive question. If your client says, for instance, "The goal is to increase standardized test scores," then the question becomes "Do you think a proposed class size reduction plan will increase standardized test scores?" This is now a positive question. You don't have to personally have the same goal as your client, but as an economist you can conduct analysis to determine the likelihood that the class size reduction plan will increase standardized test scores. As phrased (Is it a "good" plan?), the question is a normative question.

At a minimum, there is one key piece of information you need to have in order to answer your client's question. What is that one piece of information? Why do you need it?

At a minimum, you need to know the goal in order to answer this question. Without knowing the goal that your client wants to achieve with the plan, you can't determine whether it is a good plan (achieves the goal) or a bad plan (doesn't achieve the goal).

b. Refer to the four causes of disagreement discussed in article #1 by Fritz Machlup, "Why Economists Disagree." First, list the 4 causes, followed by a one phrase or sentence definition of each.

1. Different word meanings. There are many words – in economics, in the English language generally – that have more than one meaning. Sometimes we disagree with someone because, often without realizing it, we have two different definitions of a word. (For instance, many of you will ask me, Prof. Olney, "Are Econ 1 grades curved?" There is more than one definition of "curved" and so we could get into a disagreement because you have one definition in mind and I have another. That's why it's always important when there is more than one meaning to a word to clarify with each other what definition you are using.)

2. Different logical reasoning. There are common rules of logic (for instance, the rule of transitivity says "if A ⇒ B and B ⇒ C, then A ⇒ C"). (If you've never taken a course in logic, I strongly encourage you to consider taking Philosophy 12A.) Disagreements due to different logical reasoning are usually due to errors made in our logical reasoning ("logical fallacies"). Sometimes those errors are sloppy errors; sometimes they are due to an unfamiliarity with the rules of logic; sometimes they result from complex logical arguments that led to an error in reasoning. For instance, a common logical fallacy says "if A ⇒ B, then B ⇒ A." That's wrong. It's a fallacy. The most we can say is "if A ⇒ B, then if B doesn't happen we can conclude that A didn't happen" or in symbolic logic, "if A ⇒ B, then ~B ⇒ ~A."

3. Different factual assumptions. Sometimes (often!) we disagree because we are making different assumptions about how people behave or about how two things are related to each other or about something else that is relevant to our argument. Some assumptions we make are explicit, which means we have spoken them aloud or written them down. Other assumptions are implicit, which means we have not verbalized or written the assumption – and often we may not even be aware we are making it! For instance, if we are constructing an argument about how people respond when they lose their income during a period of unemployment, and one of us assumes that unemployed people are able to borrow whatever money they need from banks or relatives and the other person assumes that unemployed people are unable to borrow, then we are going to come to different conclusions about how people respond when they experience a drop in income.

4. Different value judgments. We may have different goals for policy, guided in turn by our values, by what we believe, by how we were raised, by what we want to see in the world we live in. We may or may not be able to come to agreement. We may need to agree to disagree.

Your client disagrees with your assessment of whether the class size reduction policy is a good plan. Which of those four possible causes of disagreement might help explain why you and your client disagree? Explain.

If my client and I disagree about whether the class size reduction plan is a "good" plan, our disagreement could be rooted in any of these four causes. It could be that we are defining some words differently. It could be that one of us is making a logical error (this is tricky when it is your client who is making the error and it falls to you to point it out). It could be that we are making different assumptions about how teachers and students will respond to the class size reduction, and those assumptions may impact our conclusions about whether the class

size reduction will achieve the desired goals. And it may be that we do not share common goals for the policy based on differences in our values.

For an example of analysis – the sort of analysis you learn how to do as an economist! – of the effects of reduced class size, see this article by colleagues at Berkeley's Goldman School of Public Policy: https://gspp.berkeley.edu/research/featured/the-class-size-debate-what-the-evidence-means-for-education-policy

To find more research on the effect of class size reduction, try this: go to scholar.google.com, search "class size and student achievement" (the trick to google scholar is often knowing what terms to search), restrict your results to "since 2015" so that you have the latest research. This gives you over 40,000 results . . . more papers than you can read in a day, or a lifetime. So then you can refine your search further. Remember that you can find "advanced search" by clicking the 3-bar menu icon on the upper left of the google scholar page.

2. (2 points total, ½ point for each part) Production Possibilities Frontier, Growth

Suppose the data below describe the current production possibilities for an economy that produces two goods: tourism and manufactured goods.

Quantities that can be produced per month with the currently available resources						
manufactured goods	6000	5900	5700	5400	5200	4100
tourism	0	100	200	300	350	500
Label point	A	B	C	D	E	F

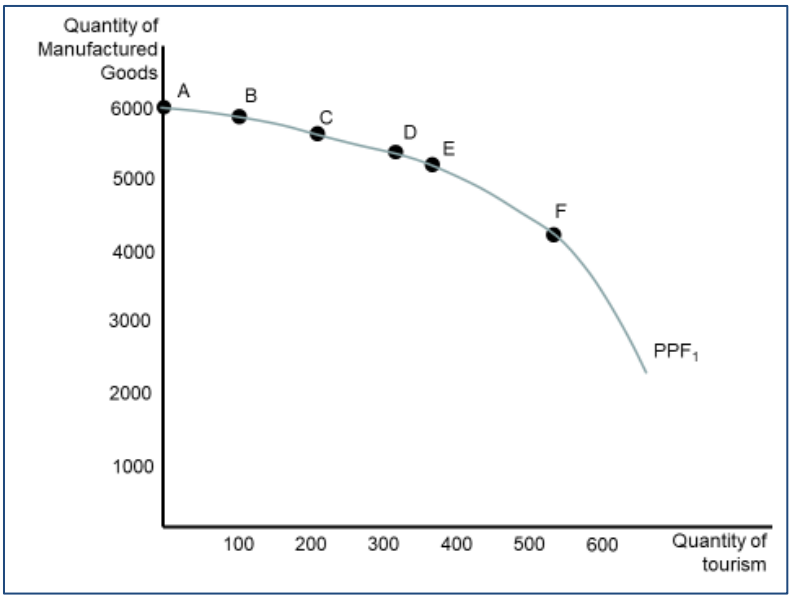
a. Does this economy exhibit increasing opportunity costs? (Yes) No (Circle one)
Explain your answer

Yes, this economy exhibits increasing opportunity costs. As the quantity of tourism is increased, the quantity of manufactured goods that can no longer be produced gets ever larger. Going from A to B, there is a 1:1 ratio (100/100) of manufactured goods foregone in order to produce more tourism. That is the opportunity cost of one more unit of tourism between A and B is 1 unit of manufactured goods. Going from D to E, the economy foregoes the opportunity to produce 4 units (200/50) of manufactured goods in order to produce each 1 additional unit of tourism. (Did you catch that the change in tourism between D and E was only 50, and the change in manufactured goods between E and F was 150? It was important to calculate the ratio of change in manufactured goods / change in tourism in order to answer the question. You wanted the opportunity cost of 1 additional unit of tourism between each point.)

If instead we wanted to ask about the opportunity cost of increasing production of manufactured goods, then we create the ratios going from F to E, E to D, and so on. Going from F to E, increasing manufactured goods requires forgoing 150/900 or 0.167 units of tourism for every additional unit of manufactured goods. Going from E to D, an increase in manufactured goods requires forgoing 50/200 or 0.25 units of tourism for every additional unit of manufactured goods. Again, the economy exhibits increasing opportunity costs.

b. Plot the PPF. Put manufactured goods on the vertical axis; tourism on the horizontal axis. Label the points. Be sure each axis is to scale. Scales can differ between axes.

The graph is at the right. Points A-F are from the table. You need not extend the PPF to the other axis. But if you did, the extension to the horizontal axis needs to continue to depict the law of increasing opportunity costs.



c. "Your PPF slopes down because of tradeoffs." Explain that sentence in words that make sense to someone not taking economics.

Your explanation should have captured the idea that if an economy is using all of its available resources (remember: we assume no deliberate waste), then in order to produce more of one type of output, it will necessarily need to produce less of the other.

For instance, the PPF illustrates the possible combinations of output that an economy can produce with its available resources (land, labor, capital) and knowledge and institutions (together, "productivity"). When we draw a PPF, the amount of resources, knowledge, and the institutions are all fixed (unchanging) for that particular drawing. If the economy is initially producing, say, 5,700 units of manufactured goods and 200 units of tourism, and then there is an increase in production of tourism, then only way to produce more tourism is to move resources – land, labor, capital – away from producing manufactured goods and toward producing tourism. So to produce more tourism requires less production of manufactured goods. Economists call that trade-offs: the economy is trading off production of manufactured goods for production of more tourism.

"Your PPF is non-linear because of the law of increasing opportunity costs." Explain that sentence in words that make sense to someone not taking economics.

Your explanation should have captured the idea that resources are not equally well-suited to all tasks and the assumption of no deliberate waste.

For instance: every time we shift resources away from producing manufactured goods and toward producing tourism, we shift the resources that are relatively good at producing tourism and relatively bad at producing manufactured goods. That's consistent with the assumption of no deliberate waste. But that means that the resources remaining in the production of manufactured goods are, each time, the ones that were relatively bad at producing tourism. And because resources aren't equally well-suited to all tasks, the pool of resources still producing manufactured goods is becoming a pool that is better and better at manufacturing but worse and worse at tourism. We keep peeling off the best tour guides, hosts, planners, chefs, and more, leaving in manufacturing the most highly productive manufacturers. So as we increasingly increase the amount of tourism, the resources remaining to be shifted from manufacturing to tourism are increasingly relatively bad at producing tourism and increasingly relatively good at producing manufactured goods. To gain the same quantity of additional output of tourism, then, requires ever more resources, which means an ever greater loss of manufactured goods.

(At this point you probably say to your non-economics friend, "Look this is a whole lot easier to understand with numbers." And then offer up a numerical example. It's a real killer of a sentence in a social setting, but in this case it truly is the easiest way for many people to understand the concept.)

d. An economic advisor suggests that the government offer tax incentives to increase the amount of tourism in the economy. What is one cost of shifting resources from the production of manufactured goods to the production of tourism?

The most obvious cost is the loss of manufactured goods as the economy moves along a PPF.

A very good answer will also reference the difference between the long run and the short run. The PPF focuses on the long run: in the long run (could be years, could be decades) when the economy is once again at full employment and all resources are fully employed, the shift away from producing manufactured goods and toward producing tourism will leave the economy on its PPF albeit at a different point (eg., D rather than C in the graph above). But the move from one point on a PPF to another does not happen instantaneously. The re-allocation process means that there will be people who have manufacturing jobs who lose their jobs. There will be manufacturing companies that lose profit and go out of business. In the long run, those workers and business owners find new opportunities in tourism. But in the short run, they bear the cost of change. How long is the long run? How short is the short run? There is not one answer. The length in months of the long and short run depend upon the types of outputs being produced, the ease of moving workers and physical capital from one activity to another.

Berkeley econ faculty Cecile Gaubert & Benjamin Faber studied the tradeoffs between tourism and manufacturing in Mexico. Their work was published this summer: Faber and Gaubert. 2019. "Tourism and Economic Development: Evidence from Mexico's Coastline." *American Economic Review*, 109 (6): 2245-93. You can access the article: https://www.aeaweb.org/articles?id=10.1257/aer.20161434 They found that contrary to this simple analysis, increasing tourism led to an ***increase*** in manufacturing. Read the article or speculate: What is one assumption that is made in the simple analysis, is critical to the usual conclusion, but that might not be true in reality?

Gaubert and Faber's research starts from the usual argument about what are the best growth strategies for developing economies, especially those with attractive locations (beaches!). One strategy is to promote international tourism, bringing in outside money to

provide employment and income which the workers spend domestically, creating jobs for others. (In macroeconomics, we call those "multiplier effects.") But one argument against a tourism-led growth strategy is that the possibilities for improvements in productivity are limited in tourism but very present in manufacturing. This argument suggests that there will be greater gains in productivity, shifting out the PPF and boosting worker/businessowner incomes, if developing economies pursue instead a manufacturing-led (traded goods) growth strategy.

Gaubert & Faber found that there are "positive spillovers" between tourism and manufacturing. That is, contrary to our result above, more tourism leads to more manufacturing, not less. One set of spillovers is obvious: when more people are employed in tourism, they earn income which they spend on locally-manufactured consumer goods & services. These macroeconomic multiplier effects are well known. The additional result of Gaubert and Faber's research is that there are gains in manufacturing productivity in tourism areas not seen in non-tourism areas of Mexico. That is, the gains in manufacturing spurred by the development of tourism are in the productivity of the manufacturing sector. They suggest these gains in manufacturing productivity due to increased tourism could result from "improving access to business services such as finance, accounting, or consulting, or by loosening credit constraints, or by facilitating contacts and business networks." (page 2248).

In our simple analysis, we assumed there was no shift of the PPF. With no shift of the PPF, more tourism necessarily results in less manufacturing. But Gaubert & Faber find that there are productivity gains in manufacturing when there is more tourism. That is, shifting toward more tourism shifts out the PPF along the manufactured goods axis. The result can be gains in both tourism and manufacturing, rather than a trade-off.

If you're interested in learning more from or about Prof. Gaubert or Prof. Faber, their websites are https://eml.berkeley.edu/~cecile.gaubert/ and https://eml.berkeley.edu//~faberb/. Prof. Gaubert teaches Econ 101A (Micro Analysis & Theory). Prof. Faber teaches Econ C171 (Economic Development).

3. (2 points total; ½ point per part) Comparative Advantage and Gains from Trade

Chris and Robin are a married couple. They both use pronouns "they/them/theirs." Both Chris and Robin are able to produce two goods: home production (meals, laundry, housekeeping, child raising) and market production (working for a wage).

- In one week, Chris can produce 4,400 market production units or 2,200 home production units or a mix of the two.
- In one week, Robin can produce 5,000 market production units or 2,000 home production units or a mix of the two.

For both Chris and Robin, their individual trade-offs between MU and HU are constant, regardless of how they allocate their time.

Currently, Chris and Robin pretty evenly share both home and work responsibilities. Chris produces 2,400 ~~consumption~~ market production units and 1,000 homemaking units per week while Robin produces 2,500 ~~consumption~~ market production units and 1,000 homemaking units per week.

a. Fill in the table at the right, showing the opportunity costs for Jordan and for Chris. Show your work here or in the table.

Chris's end points are 4,400 MU or 2,200 HU
Robin's end points are 5,000 MU or 2,000 HU

Calculation Example: *Chris's HU opportunity cost = maximum amount of units of MU Chris can produce / maximum amount of units of HU Chris can produce*

	Opportunity Cost of 1 Market production unit ("MU")	*Opportunity Cost of 1 Home production unit ("HU")*
Chris	*2,200 HU / 4,400 MU =* ***0.5 HU per MU***	*4,400 MU / 2,200 HU =* ***2 MU per HU***
Robin	*2,000 HU / 5,000 MU =* ***0.4 HU per MU***	*5,000 MU / 2,000 HU =* ***2.5 MU per HU***

b.
Who has the absolute advantage in the production of market production units , MU? Chris or Robin (circle one)

Who has the absolute advantage in the production of home production units, HU? Chris or Robin (circle one)

Who has the comparative advantage in the production of market production units , MU? Chris or Robin (circle one)

Who has the comparative advantage in the production of home production units, HU? Chris or Robin (circle one)

Absolute advantage is when one economy/person can produce a given amount of output with fewer resources than another. Equivalently, absolute advantage is when one economy/person can produce <u>more</u> output with the same amount of resources than can the other economy/person.

***Robin** has the absolute advantage in the production of MU because Robin can produce 5,000 CU a week, whereas Chris can produce only 4,400 CU per week.*

***Chris** has the absolute advantage in the production of HU because Chris can produce 2,200 HU per week but Robin can produce only 2,000 HU per week.*

Comparative advantage depends on who has the lower opportunity cost.

***Robin** has the comparative advantage in producing MU, because Robin has to give up producing 0.4 HU to produce 1 MU but Chris has to give up producing 0.5 HU in order to produce 1 MU.*

***Chris** has the comparative advantage in producing HU, because Chris has to give up only 2 MU to produce 1 HU whereas Robin needs to give up producing 2.5 market production units (MU) to produce 1 home production unit (HU).*

c. Chris and Robin are adopting a baby! One of them will be the stay-at-home parent, producing only home production units. The other will continue to work, producing only market production units. If their goal is to allocate their resources efficiently ("productive efficiency"), what will they decide? In one week, how many home production units and how many market production units will they produce in total? What are the gains from trade (that is, compared with the total production when they both work, how many additional MU and how many additional HU will Chris and Robin collectively produce when they completely specialize and then trade)? (answer questions by filling in blanks)

***Chris** will produce home production units and **Robin** will produce market production units.*

*In total, they will produce **2,200** home production units and **5,000** market production units.*

*The gains from trade are **200** home production units and **100** market production units.*

(show gains from trade computations here)

See the prompt for the initial production amounts: Chris: 2,400 MU and 1,000 HU; Robin, 2,500 MU and 1,000 HU.
Gains in home production = new – old = 2,200 – (1,000 + 1,000) = 200 HU
Gains in market production = new – old = 5,000 – (2,400 + 2,500) = 100 MU

d. Should Chris and Robin specialize and trade? Explain your answer. (It's a normative question! Remember to include the first step in answering a normative question.)

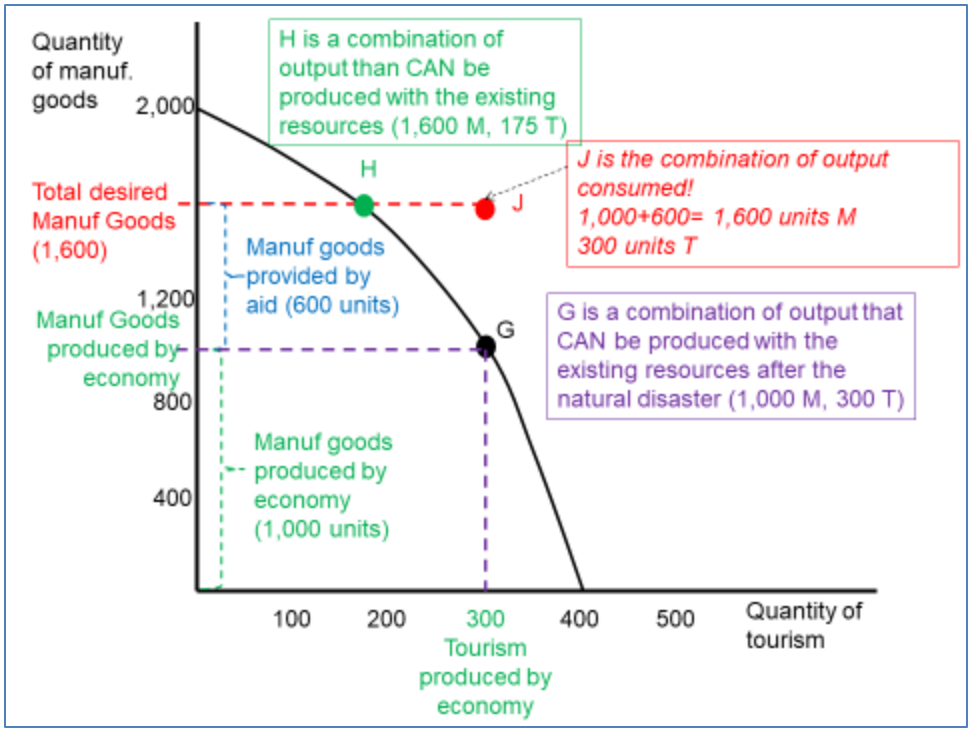
Answers will vary. The key features of a good answer: [1] does it explicitly state a goal, [2] does it offer a recommendation based on that goal, and [3] does it explain how the recommendation helps to achieve the goal. Here's one sample:

It depends upon their goal! If their goal is to maximize total output of home production and market production units, then Chris and Robin should specialize and trade. But they may have different goals that lead to a different decision. Perhaps their goal is to share parenting, in which case they may decide they should both work part-time and parent part-time, sharing responsibility for producing home production and market production units even though they would forego the gains from trade.

Interested in pursuing these ideas further? Check out the book *It's Not You, It's the Dishes (originally published as Spousonomics): How to Minimize Conflict and Maximize Happiness in Your Relationship,* by Paula Szuchman and Jenny Anderson.

4. (1 point) International Aid

An economy that produced tourism and manufactured goods experienced a terrible natural disaster. The natural disaster destroyed a large quantity of the capital used to produce both types of output, shifting the economy's PPF inward toward the origin. Aid organizations from other economies provided large quantities of manufactured goods to the economy following the natural disaster. How does the provision of aid allow the economy to consume a combination of output beyond its PPF? Illustrate your answer with a graph.



The comparison here is between the resources for production [1] coming from the affected economy as opposed to [2] being provided through aid. If aid provides either resources for producing output or output itself, then the affected economy can use more of its own resources – its people, its equipment – for producing tourism.

In the graph at right, the economy uses its resources to produce tourism output equal to 300 units and manufactured goods equal to 1,000 units. Aid from outside the economy provides another 600 units of manufactured goods. The total output of manufactured goods available in the economy is thus the sum, 1,600 = 1,000 units produced with their own resources plus 600 units produced with aid resources. Because the economy is producing only 1,000 units of manufactured goods with its own resources, it is able to allocate its remaining resources to the production of tourism, allowing the economy to produce 300 units of tourism. If the economy had been required to use its own resources to produce the 1,600 units of manufactured goods, the tourism output would have been only 175 units, represented by point H on the graph.

It is important to remember that resources do not include money. Giving money in the wake of a natural disaster will not increase the economy's land, its (physical) capital, its labor force, or its knowledge. To increase the economy's own production, it is resources – not money – that are needed. Labor: "Boots on the ground." Capital: Lumber, concrete, steel, hammers, nails, equipment. Knowledge: Engineers with knowledge of how to produce more efficiently so as to combine the existing capital and labor and land and produce more output. After the immediate period of relief, donations of money are important not for the money itself, but because the donations can be used to purchase either resources from outside the damaged economy, or to purchase the output that otherwise would have been produced in the affected economy.

An article about the use of international aid following the Boxing Day 2004 Tsunami in Indonesia, Sri Lanka, and Thailand that killed over 200,000 people is at https://www.theguardian.com/global-development/2014/dec/25/where-did-indian-ocean-tsunami-aid-money-go .

An article that looks at the effect of international aid on the provision of health care following the Haitian earthquake is at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4347354/.

There's an entire journal related to these topics, the International Journal of Disaster Risk Reduction. Unfortunately, it's a journal controlled by Elsevier, so we at UCB can't access its current contents, only abstracts. Nevertheless, this article about island economies and the challenges of recovery following a hurricane looks interesting, at least from the abstract: https://doi.org/10.1016/j.ijdrr.2019.101244

5. (3 points total) Economic Growth.

Choose any country and any time period, current or historical. Write a one-page essay in which you address these questions:

- What is one development in that country that enhanced economic growth?
- In general, how did that development enhance growth?
- If you were a policy maker responsible for enhancing growth today in an extremely poor country such as Malawi or Burundi, would you recommend adoption of the development you discussed above? Why or why not?

Of course, there are lots of specific examples, so we can't provide you with "this is what you should have written."

Guidelines:
a. Did you follow the specifications? One-page essay? Max of 400 words? 1" margins? Double-spaced? 10 or 11 or 12 pt font? Your name and date & word count in the top right corner? Your essay stapled at the back of your problem set? Attached your "works cited" list (either at the end of page 1 or on a separate page)? Submitted both via bCourses & via Gradescope?

If so, you remained eligible for full credit. If not, you lost a point right off the top.

b. Did you choose an example from a country in some time period? If so, good! Then you should have been able to discuss one development in that country that enhanced economic growth. The idea here is to integrate what you have learned in other courses (history, civics, anthropology, and so on) into what you are learning in economics.

Economic growth is enhanced by either an increase in the quantity of inputs or an increase in productivity. The end of Chapter 5 of Macro as a Second Language lists a lot of institutional changes that can enhance economic growth.

For instance, if you chose the United States, you could have mentioned the Louisiana Purchase (a huge increase in the quantity of land), or any of several immigration reforms after 1965 (increases in labor), or the spread of computers in the late 20th century (a big increase in physical capital). Or you could have focused on an institutional change that enhanced productivity and therefore contributed to economic growth: the rise of public education in the first half of the 20th century (raising educational attainment dramatically in just a few decades) or the Morrill Land Grant Act of 1862 (establishing public universities around the country); development of patent laws (which encourage innovation); establishment of a national currency as part of the Banking Acts of the 1860s (a development in financial institutions that made trade easier); or the Federal Aid Highway Act of 1956 (establishing the interstate highway system, which lowers transportation costs markedly); or the writing and adoption of the U.S. Constitution (which ensures that political power passes smoothly from one leader to the next, with no risk that debts incurred by one President's Administration will not be honored by a subsequent administration, lowering borrowing costs); or the system of Free and Common Socage (which defines our property rights system, granting an individual right of waste and alienation, and freedom from willy-nilly government levies, encouraging improvement in property); or the establishment of an independent judiciary (which enforces contracts not based on who offers the judges the biggest bribe but based on the principles of law).

Your paper could have used any country, any time period, and any example – so long as it was real and so long as you chose something that enhanced growth either through an increase in quantity of inputs or an increase in productivity.

c. Did you explain how that development enhanced economic growth?

You needed to link your example either to an increase in the quantity of inputs or an increase in productivity. From there, economic theory says we expect to see an increase in economic growth.

d. Did you discuss whether or not that same example would help a really poor country today?

Here you wanted to think about whether the example you came up with was specific to your country or time. Were there prerequisites in place that enabled that development to enhance growth? Are those prerequisites in place in an extremely poor country today?

For instance, "they should lower interest rates because that will increase spending for physical capital" is a bit of advice that presumes a well-functioning financial system. Or "they should establish public universities using federally owned land" is a bit of advice that presumes a reasonable share of the population is ready for university education.