

ANSWERS TO QUESTIONS FOR DISCUSSION AND PROBLEMS

QUESTIONS FOR DISCUSSION

- 1) Americans already enjoy living standards that far exceed world averages. Do we have enough? Should we even try to produce more? **(LO 2-2)**

Answer: The reality of human nature is that needs are culturally conditioned. There is never enough. Just to maintain living standards as population grows will require more output.

2. Why do we measure output in value terms rather than in physical terms? For that matter, why do we bother to measure output at all? **(LO 2-1)**

Answer: Our economy produces thousands of different items, ranging from paper clips to sophisticated electronic equipment. Value estimates are a common denominator for measuring all of these different things. In addition, in our complex and decentralized market economy, it is impossible to account for every item of output produced. Sales records are more available for estimates of value than are output numbers across the economy. Measures of output provide benchmarks that show if growth is occurring and at what rate.

3. Why do people suggest that the United States needs to devote more resources to investment goods? Why not produce just consumption goods? **(LO 2-3)**

Answer: Investment goods are capital goods such as machines and factories that help us produce more output. If we concentrated on only consumption goods, we would be unable to replace our machines as they wore out or to expand our productive capacity by producing more, and more efficient, machines.

4. The U.S. farm population has shrunk by over 25 million people since 1900. Where did they all go? Why did they move? **(LO 2-4)**

Answer: They went to the cities to become factory workers and service workers because there were jobs available for them in those sectors of the economy. There were fewer and fewer jobs in the agricultural sector because of the advances of technology in that sector.

5. Rich people have over 15 times as much income as poor people. Is that fair? How should output be distributed? **(LO 2-5)**

Answer: Fair is generally considered to be a relative term. On an individual basis, many would consider it 'fair' if they personally received more or if someone else received less. In a market economy, the distribution of output (and therefore income) is determined primarily by the laws of supply and demand. This often results in an unequal distribution. However, in order to make sure that the distribution is not so unequal that we have people literally starving to death in the streets, the government steps in and lessens the degree of inequality through various programs and tax policies. Thus, at some point, fairness does become less subjective and more objective when the inequality causes lives being put at risk, which, once recognized, results in a redistribution of income.

6. If taxes were more progressive, would total output be affected? **(LO 2-5)**

Answer: Taxes create a disincentive to engage in any activity that is being taxed. If taxes were more progressive, people who face the higher taxes would have less incentive to work. As a result, total output would decline.

7. Why might income inequalities diminish as an economy develops? **(LO 2-5)**

Answer: As an economy develops, more jobs become available and thus more people will work and earn incomes. There will also be more capital available and therefore labor productivity – and income of workers – will rise. Although incomes will not likely be equalized, on average there should be, and generally is, less income disparity.

8. Why is per capita GDP so much higher in the United States than in Mexico? **(LO 2-3)**

Answer: U.S. workers have much more capital, technology, and education to work with, which raises their productivity (output per worker) far above that of Mexican workers.

9. Do we need more or less government intervention to decide WHAT, HOW, and FOR WHOM? Give specific examples. **(LO 2-4)**

Answer: It really depends on the type of goods and services society would like to see provided. Some products such as clean water and clean air are not usually provided well by private markets and more government intervention might be desired. Other products such as computers, food, etc., are usually best provided by markets and less government intervention might be desired.

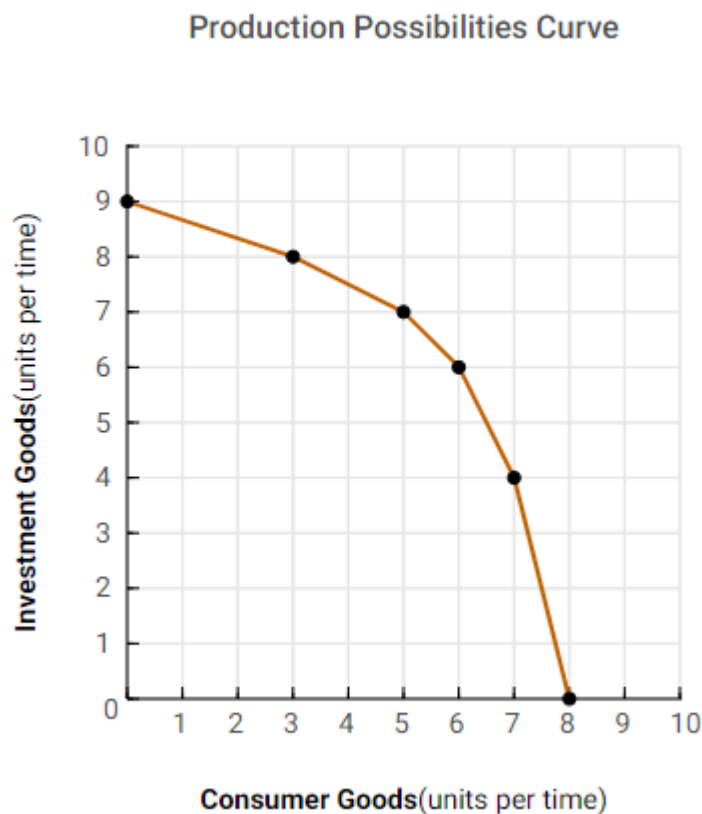
10. **POLICY PERSPECTIVES** What can poor nations do to raise their living standards? **(LO 2-3)**

Answer: This is a complicated issue. A few of the things that poor nations can do to raise their living standards include increasing their investment/consumption ratio, investing in human capital, and reducing illiteracy. Many believe that poor nations will need the assistance of the rich nations of the world to achieve this goal.

PROBLEMS

1) Referring to the figure,

- (a) What is the opportunity cost of increasing investment from 6 units to 8 units?
- (b) What will happen to future production possibilities if investment increases now?
- (c) What will happen to future production possibilities if only consumer goods are produced now? **(LO 2-1)**



Answer:

- (a) The opportunity cost of increasing investment is the loss of consumer goods. Specifically, when investment goods increase from 6 to 8, consumer goods decrease from 6 to 3, a decrease of 3 units.

- (b) Investment goods include the plant, machinery, and equipment that are produced for use in the business sector. The economic growth that has lifted our living standards so high was fueled by past investments—the factories, telecommunications networks, and transportation systems built in the past. If investment increases it will improve our stock of capital and will expand our production possibilities, causing our curve to shift outward (that is, increase). This requires us to limit our production of consumer goods (that is, save) so scarce resources can be used for investment.
- (c) Consumer goods include everything consumers buy. If only consumer goods are produced, equipment and factories (for example) will not be replaced and production possibilities will diminish leading to a shift inward (that is, decrease)

2) Suppose the following data describe output in two different years:

Item	Year 1	Year 2
Apples	20,000 @ \$0.25 each	30,000 @ \$0.30 each
Bicycles	700 @ \$800 each	650 @ \$900 each
Apps	10,000 @ \$1.00 each	12,000 @ \$2.00 each

- (a) Compute *nominal* GDP in each year.
- (b) By what percentage did nominal GDP change between Year 1 and Year 2?
- (c) Now compute *real* GDP in Year 2 by using the prices of Year 1.
- (d) By what percentage did real GDP change between Year 1 and Year 2? **(LO 2-1)**

Answer:

- (a) Nominal GDP is the value of output measured in current prices.

Nominal GDP			
Year 1 = (year 1 output) × (year 1 prices)			
Apples	20,000 × \$0.25	=	\$5,000
Bicycles	700 × \$800	=	\$560,000
Apps	10,000 × \$1.00	=	\$10,000
GDP			\$575,000
Year 2 = (year 2 output) × (year 2 prices)			
Apples	30,000 × \$0.30	=	\$9,000
Bicycles	650 × \$900	=	\$585,000
Movie rentals	12,000 × \$2.00	=	\$24,000
GDP			\$618,000

- (b) From Year 1 to Year 2, GDP increased by \$43,000. Using the percentage change formula = $[(\text{new value} - \text{original value}) \div \text{original value}] \times 100$, this is a 7.5 percent increase (= $[(\$618,000 - \$575,000) \div \$575,000] \times 100 = 7.5\%$).
- (c) Real GDP is the inflation-adjusted value of GDP: the value of output measured in constant prices.

Real GDP			
Real GDP Year 2 = (year 2 output) $\times$ (year 1 prices)			
Apples	$30,000 \times \$0.25$	=	\$7,500
Bicycles	$650 \times \$800$	=	\$520,000
APPS	$12,000 \times \$1.00$	=	\$12,000
GDP			\$539,500

- (d) Real GDP in Year 1 is equal to nominal GDP in Year 1, so real GDP in Year 1 is \$575,000. In Year 2, it is \$539,500, a decrease of \$35,500. Using the percentage change formula = $[(\text{new value} - \text{original value}) / \text{original value}] \times 100$, this represents a decline of 6.2% $[(539,500 - 575,000) / 575,000] \times 100 = 6.2\%$.

- 3) GDP per capita in the United States was approximately \$60,000 in 2019. Use the growth formula to answer the following questions:
- (a) What will it be in the year 2025 if GDP per capita grows each year by 0 percent?
- (b) What will it be in the year 2025 if GDP per capita grows each year by 2 percent?
- (LO 2-1)**

Growth Formula: $(\text{future value}) = (\text{present value}) \times (1 + r)^t$

present value = this year's GDP per capita

future value = GDP per capita in the future

r = the rate of increase = % growth per year

^t = number of years of growth

Answer:

Growth Formula: $(\text{future value}) = (\text{present value}) \times (1 + r)^t$, where present value = this year's GDP per capita, future value = GDP per capita in the future, r = the rate of increase = % growth per year, and t = number of years of growth.

- (a) GDP per capita will remain the same (= \$60,000) in 2025 if the GDP per capita growth rate is 0 percent. Intuitively, if GDP per capita does not grow, then there will be no change in GDP per capita between 2019 and 2025.

GDP per capita in 2025 = (GDP per capita in 2019) $\times (1 + r)^t$. (Note there are 6 years of growth between 2019 and 2025, the growth rate is 0 percent, and GDP per capita in 2019 is \$60,000.)

$$\text{GDP per capita in 2025} = \$60,000 \times (1 + 0)^6$$

$$\text{GDP per capita in 2025} = \$60,000 \times 1$$

$$\text{GDP per capita in 2025} = \$60,000$$

- (b) GDP per capita will increase to \$67,560 in 2025 if the GDP per capita growth rate is 2 percent.

GDP per capita in 2025 = (GDP per capita in 2019) $\times (1 + r)^t$. (Note there are 6 years of growth between 2019 and 2025, the growth rate is 2 percent, and GDP per capita in 2019 is \$60,000.)

$$\text{GDP per capita in 2025} = \$60,000 \times (1 + 0.02)^6$$

$$\text{GDP per capita in 2025} = \$60,000 \times (1.02)^6$$

$$\text{GDP per capita in 2025} = \$60,000 \times 1.126$$

$$\text{GDP per capita in 2025} = \$67,560$$

- 4) Using income data from Table 2.3, if a McDonald's Happy Meal costs \$3, how many Happy Meals *per week* could a.) the average American afford? b.) the average Afghan afford? **LO5**

Answer:

(a) The per capita income in the United States was \$59,332. If a McDonald's Happy Meal costs \$3, the average person could afford 380 Happy Meals per week (= \$59,332 $\div$ 52 weeks $\div$ \$3 per Happy Meal = 380 Happy Meals per week).

(b) The per capita income in Afghanistan was \$586. If a McDonald's Happy Meal costs \$3, the average person could afford 4 Happy Meals per week (= \$586 $\div$ 52 weeks $\div$ \$3 per Happy Meal = 4 Happy Meals per week).

- 5) Assume that total output is determined by this formula:

$$\text{number of workers} \times \text{productivity} = \text{total output}$$

- (a) If the workforce is growing by 1 percent a year but productivity doesn't improve, how fast can output increase?
- (b) If productivity increases by 3 percent and the number of workers increases by 1 percent a year, how fast will output grow? **(LO 2-3)**

Answer:

To answer this question, it can be useful to make up an example. Let's assume the following for our economy:

number of workers = 100

productivity = 100

Therefore, total output is (number of workers) $\times$ (productivity) = (100) $\times$ (100) = 10,000.

- (a) If the workforce grows by 1 percent (from 100 workers to 101 workers) and output doesn't change, then output can increase by:

Total output = (number of workers) $\times$ (productivity) = (101) $\times$ (100) = 10,100.

Using the percentage change formula = [(new value – original value)/original value] $\times$ 100, the percentage change in output is [(10,100 – 10,000)/(10,000)] $\times$ 100 = 1%. Therefore, output can increase by 1 percent.

- (b) If productivity increases by 3 percent (from 100 to 103) and the number of workers increases by 1 percent a year (from 100 workers to 101 workers), then output can increase by:

Total output = (number of workers) $\times$ (productivity) = (101) $\times$ (103) = 10,403.

Using the percentage change formula = [(new value – original value)/original value] $\times$ 100, the percentage change in output is [(10,403 – 10,000)/(10,000)] $\times$ 100 = 4.03%. Therefore, output can increase by approximately 4 percent.

- 6) According to the News Wire “Manufacturing: Fewer Jobs, More Output,” since 2000, a) has manufacturing output increased or decreased? (b) has employment increased or decreased? (c) has productivity increased or decreased? (*Hint: Productivity = total output $\div$ number of workers*) **(LO 2-3)**

Answer:

According to the article,

(a) Manufacturing output has increased by more than double.

(b) Manufacturing employment has decreased by 31%.

(c) Manufacturing productivity has increased by more than three times.

- 7) According to Table 2.4,

(a) what is the average income in the United States?

(b) what percentage of the income of people in the highest fifth would have to be taxed away to bring them down to that average? **(LO 2-5)**

Answer:

- (a) The average income in the United States is \$86,220. To calculate this national average, you sum the averages of each fifth of the households and then divide by 5.

$$= (\$221,800 + \$99,000 + \$61,600 + \$35,400 + \$13,300) \div 5 = \$86,220$$

- (b) The highest fifth of the U.S. population earns \$221,800 on average. To bring this average income down to the national average income of \$86,220, the tax must equal \$135,580 (in other words, \$135,580 must be "taxed away") (= $\$221,800 - \$86,220 = \$135,580$).

Using the percentage change formula, this represents a 61 percent decrease in household income.

$$\begin{aligned} &= [(\text{new value} - \text{original value}) \div (\text{original value})] \times 100 \\ &= [(\$86,220 - \$221,800) \div (\$221,800)] \times 100 \\ &= [-\$135,580 \div \$221,800] \times 100 \\ &= 61\% \text{ decrease} \end{aligned}$$

- 8) According to the News Wire "Global Inequality," what is the average per capita income in nations where the highest-income decile gets (a) at least half of total income? (b) less than 30 percent of total income? **(LO 2-5)**

Answer:

- (a) The average per capita income in nations listed in the table where the highest income gets at least 50 percent of total income is \$12,920. Of the countries listed, Namibia, South Africa, and Botswana fit this criterion. To calculate the average per capita income of these three countries, we add their average per capita income and then divide by 3.

$$= (\$10,380 + \$12,870 + \$15,510) \div 3 = \$12,920$$

- (b) The average per capita income in nations listed in the table where the highest income is less than 30 percent of total income is \$41,590. Of the countries listed, France, Spain, Great Britain, and Sweden fit this criterion. To calculate the average per capita income of these four countries, we add their average per capita income and then divide by 4.

$$= (\$41,680 + \$34,700 + \$41,280 + \$48,700) \div 4 = \$41,590$$

- 9) Complete the following table:

	Before Tax Income	Tax Rate	Tax Paid	After Tax Income
High-income Family	\$500,000	37%	\$185,000	\$315,000
Middle-income Family	\$ 50,000	20%	\$ 10,000	\$ 40,000

Low-income Family	\$ 20,000	10%	\$ 2,000	\$ 18,000
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What is the ratio of a high-income family's income to a low-income family's income (a) before taxes? (b) after taxes? (c) Is this tax progressive? **(LO 2-5)**

Answer:

To complete the table:

The tax paid by a high-income family equals $\$185,000 = (\text{before-tax income}) \times (\text{tax rate}) = \$500,000 \times 0.37$. The after-tax income equals $\$315,000 = (\text{before-tax income}) - (\text{tax paid}) = \$500,000 - \$185,000$.

The middle-income family pays a tax of $\$10,000 = (\text{before-tax income}) \times (\text{tax rate}) = \$50,000 \times 0.20$. The after-tax income equals $\$40,000 = (\text{before-tax income}) - (\text{tax paid}) = \$50,000 - \$10,000$.

The low-income family pays a tax of $\$2,000 = (\text{before-tax income}) \times (\text{tax rate}) = \$20,000 \times 0.10$. The after-tax income equals $\$18,000 = (\text{before-tax income}) - (\text{tax paid}) = \$20,000 - \$2,000$.

- (a) The before-tax ratio of a high-income family to a low-income family is $25 = (\text{high-income before-tax income}) \div (\text{low-income before-tax income}) = \$500,000 \div \$20,000$.
- (b) The after-tax ratio of a high-income family to a low-income family is $17.5 = (\text{high-income after-tax income}) \div (\text{low-income after-tax income}) = \$315,000 \div \$18,000$.
- (c) There are a couple of different ways to determine if a tax is progressive. First, a tax system in which average tax rates rise as incomes rise is a progressive tax system. In this example, higher incomes are taxed at a higher rate (low income is taxed at 10 percent, middle income is taxed at 20 percent, and high income is taxed at 37 percent). Second, a progressive tax makes after-tax incomes more equal than before-tax incomes. We can see this by comparing the before- and after-tax ratios. In this example, since the after-tax ratio is lower, this means the after-tax incomes are more equal than the before-tax incomes.

10) In 2018, the United States devoted about 0.19 percent of its \$20 trillion GDP to development assistance. (a) How much money is that? (b) How much aid does that imply for each of the 3 billion "extremely poor" people in developing nations? **(LO 2-2)**

Answer:

- (a) If the United States devotes 0.19 percent of its \$20 trillion GDP to development assistance, this is equal to \$38 billion going to development assistance. Remember that \$20 trillion equals \$20,000 billion.
- $$= \text{GDP} \times \text{percent devoted to development assistance} = \$20 \text{ trillion} \times 0.19\% = \$20,000 \text{ billion} \times 0.0019 = \$38 \text{ billion}$$
- (b) This \$38 billion is approximately \$12.67 in aid for each of the 3 billion poor people in the developing nations.
- $$= \text{development assistance} \div \text{poor} = \$38 \text{ billion} \div 3 \text{ billion} = \$12.67 \text{ in aid on average per poor person}$$