Fall 2023 Professor Emmanuel Saez
University of California, Berkeley

# ECONOMICS 2

## FINAL EXAMINATION
## SOLUTIONS

1. Put your name, your SID number, and your GSI's name or your section number in the blanks provided on the front of the exam. ***Please do not put your name or your GSI's name anywhere else on the exam.***

2. The exam is written on ***both sides of the page***. Be sure to answer all the questions.

3. Write all of your answers directly on the exam in the spaces provided. **Use a dark enough pen so that answers remain legible** after electronic scanning.

4. Use blank pages at the back for scratch paper NOT your own paper.

5. There are **30 points** in total.

6. Turn off and put away all cellphones and other electronics.

7. We collect the exams at exactly 6:30 p.m.

**PLEASE DO NOT OPEN THE EXAM UNTIL INSTRUCTED TO DO SO.**

Name _____

SID Number _____

GSI or Section Number _____

***During the exam, I will NOT obtain help from anyone, provide help to anyone else, or use any notes or other resources. Sign below:***

_____

**PAGE FOR GRADING ONLY (STUDENTS SHOULD SKIP IT)**

QUESTION 1: _____

QUESTION 2: _____

PROBLEM 3a: _____

PROBLEM 3b: _____

PROBLEM 3c: _____

QUESTION 4: _____

QUESTION 5: _____

QUESTION 6: _____

PROBLEM 7: _____

PROBLEM 8a: _____

PROBLEM 8b: _____

PROBLEM 8c: _____

PROBLEM 9: _____

MULTIPLE CHOICE: _____

**TOTAL:**_____

## PART I: MATERIAL SINCE THE 2ND MIDTERM [7.5 POINTS TOTAL]

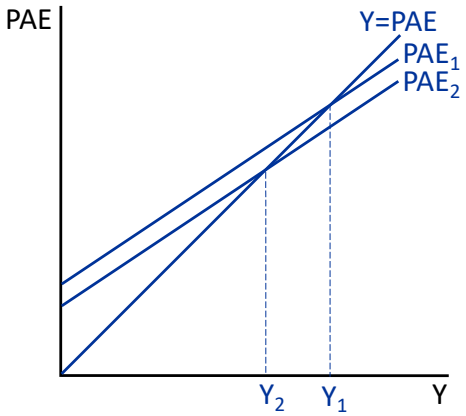
### Short Answer

Answer both questions. Be sure to explain your answers and to draw diagrams where they are appropriate. This part uses the Keynesian cross framework.

**1.** Suppose the government lowers government purchases G. What will this do to total output Y and consumption C in the short run? Do C and Y change by the same amount? Use a diagram and the equations discussed in class to explain your answer. **[1.5 point]**

Y will fall. Recall here that consumption C in PAE takes the form C=Co+c*(Y-T) with c<1 being the mpc (marginal propensity to consume) and Co the autonomous consumption (which does not vary with Y). The change in C is equal to c times the change in Y so C falls by **less** than Y.

Short-Run Effects of a decrease in govt spending

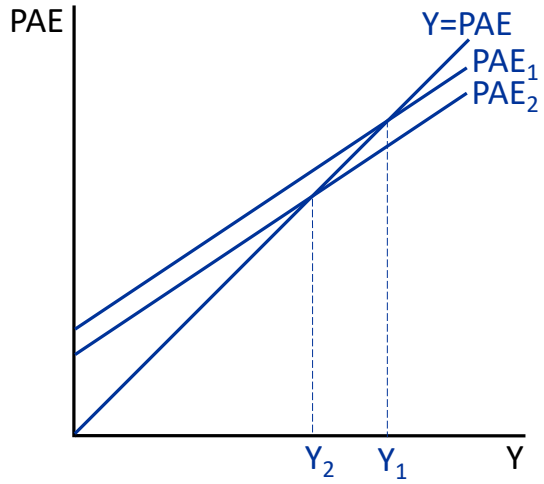



PAE=C+I+G+NX so decreasing G shifts down the PAE which lowers output.

**2.** How will an increase in net-taxes T affect output Y in the short run? Does increasing T by $100 billion have the same effect on Y as decreasing G by $100 billion? Use a diagram and the equations discussed in class to explain your answer **[1.5 points]**

Recall again here that consumption C in PAE takes the form $C=C_0+c*(Y-T)$ with $c<1$ being the mpc (marginal propensity to consume) and $C_0$ the autonomous consumption (which does not vary with Y).

Short-Run Effects of a Tax Increase




PAE=C0+c*(Y-T)+I+G+NX so increasing T shifts down the PAE which lowers output. The effect of T is smaller than G because the mpc c is lower than 1

## Problem

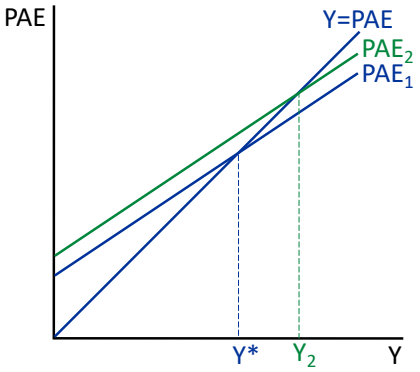
Answer all parts of the question. Be sure to explain your answers and to draw diagrams where they are appropriate. Your explanation and analysis determine your grade.

**3.** Suppose the economy is in long-run equilibrium (so that output is equal to potential and inflation is steady), and that firms then become permanently more optimistic about their future marginal revenue products of capital.

**a.** What will be the short-run effect of this change on output? Use a diagram and the equations discussed in class to explain your answer. **[1.5 points]**

This is a situation where investment I of businesses increases due to "animal spirits". This shifts up the PAE=C+I+G+NX and hence boosts output Y above Y* in the short-run through the Keynesian cross model.

A Rise in Animal Spirits = increase in planned investment I




PAE=C+I+G+NX so increasing I shifts up the PAE which increases output above Y*

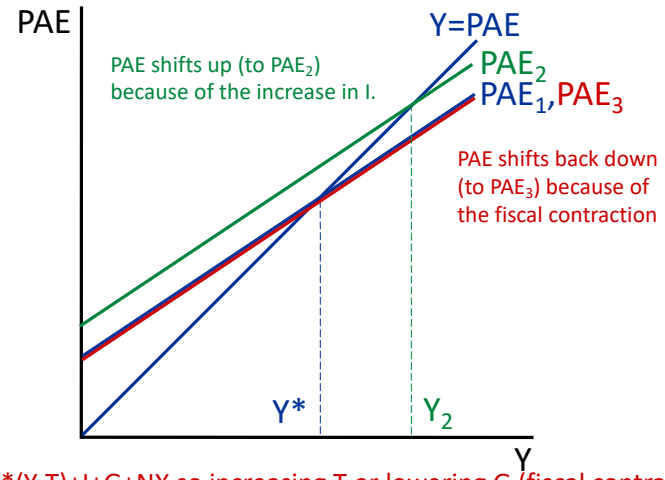
**b.** Explain how will inflation and the real interest rate behave in the short-run and the medium-run as the economy returns to its long-run equilibrium? (no diagram needed here) **[1.5 points]**

Once Y is above Y*, the economy is overheated which will push the inflation up above its target level. The Fed reaction function linking r choice by the Fed to inflation will then make the Fed increase the real interest rate. This increase in r shifts down the PAE until the point where equilibrium output returns to Y*.

**c.** Explain how the government can use fiscal policy to undo the business cycle discussed in a. and b. and maintain the economy at its potential output. Use a diagram to explain your answer **[1.5 points]**

Using the Keynesian cross theory, the government can increase net taxes T or decrease government spending G to lower down the PAE (as in questions 1 and 2). If this fiscal policy manages to exactly offset the increase in PAE from a., then the economy stays at potential output Y* and there is no impact on inflation (and hence no change in interest rate set by the Fed).

Combining the Effects of an Increase in I and a Fiscal Contraction




PAE=C0+c*(Y-T)+I+G+NX so increasing T or lowering G (fiscal contraction) shifts down the PAE which lowers output back to Y*.

## PART II: SHORT ANSWER [5 POINTS TOTAL]

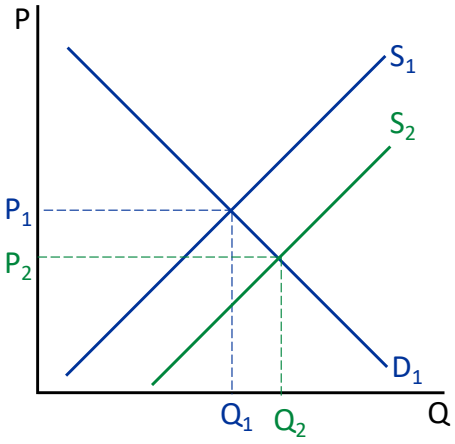
Answer all questions. Be sure to explain your answers and to draw diagrams where they are appropriate.

**4.** Consider the textile industry, which is highly competitive and begins in long-run equilibrium. How will a fall in the price of cotton (an input to the production of textiles) affect the demand and supply curves and the market equilibrium price and quantity? **[1.5 points]**

A fall in the price of cotton reduces the costs of production and hence shifts the supply curve down. It does not affect demand. This reduces the price and increases the quantity produced.

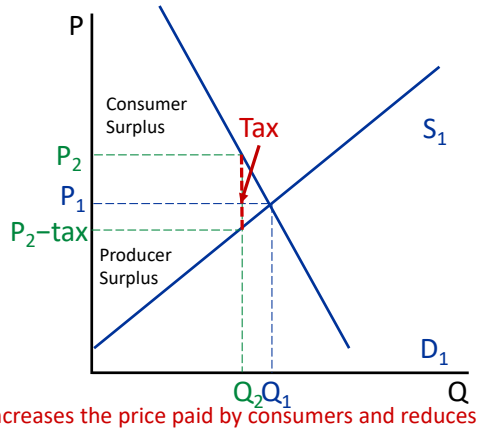
Textile market: Fall in price of cotton input

The supply curve shifts out



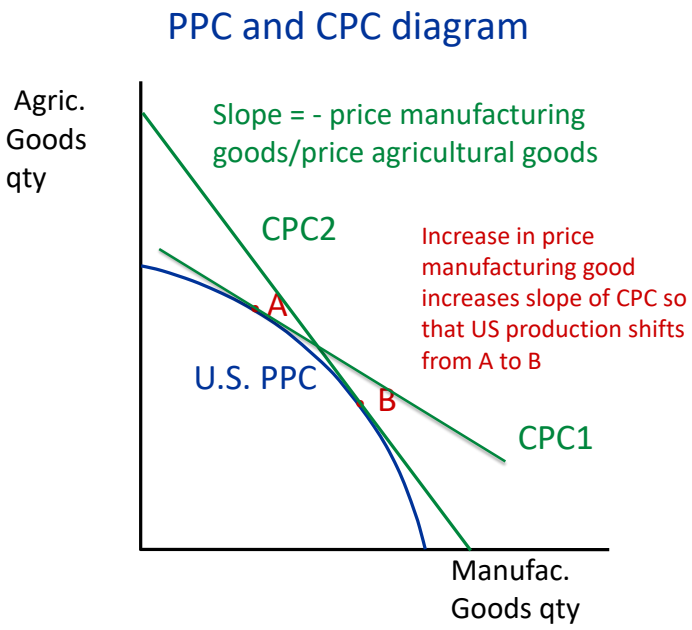
**5.** How will a per-unit tax on a good physically collected from sellers affect the price consumers pay for the good and the price sellers get from selling the good? Use a diagram to explain your answer **[1.5 points]**

Effects of a consumption tax




A tax increases the price paid by consumers and reduces the price received by sellers.

**6.** Suppose the US produces agricultural goods and manufactured goods (and faces the normal rising opportunity cost as it produces more of either good). How would a rise in the world price of manufactured goods (relative to agricultural goods) affect the combination of agricultural and manufactured goods the US wants to produce? Use a diagram to explain your answer **[2 points]**



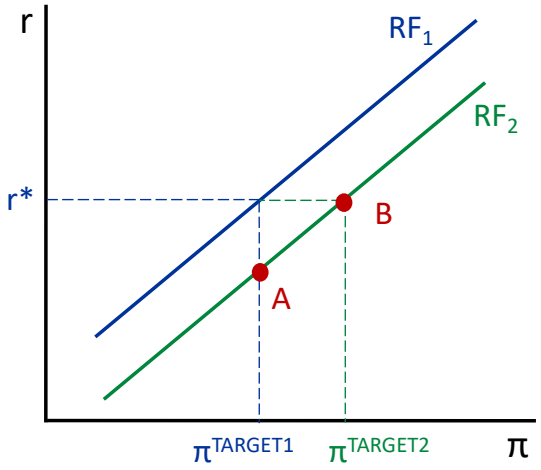

The PPC is the production possibility curve of the US. It bows out as in the diagram due to decreasing returns in production.
The CPC is the consumption possibility curve of the US. It has slope -pm/pa where pm and pa are the world prices of manufacturing and agricultural goods. The US produces a point A, where the CPC1 is tangent to the PPC which generates the largest CPC for the US. A rise in pm makes the CPC steeper (CPC2). The new tangency point is point B where the US produces more manufacturing goods and less agricultural products than in point A.

## PART III: PROBLEMS [7.5 POINTS TOTAL]

Answer all parts of each question. Be sure to explain your answers and to draw diagrams where they are appropriate. Your explanation and analysis determine your grade.

**7.** Assume the economy is in long-run equilibrium. Now, suppose the Federal Reserve shifts its reaction function in an expansionary direction (the reaction function of the Fed determines the interest rate the Fed chooses as a function of inflation). What does the expansionary shift in the reaction function imply about the Fed's choice of the real interest rate in the short run and the Fed's long-run target rate of inflation? Use a diagram to explain your answer **[1.5 points]**

A Shift in the Reaction Function and the Change in the Fed's Inflation Target

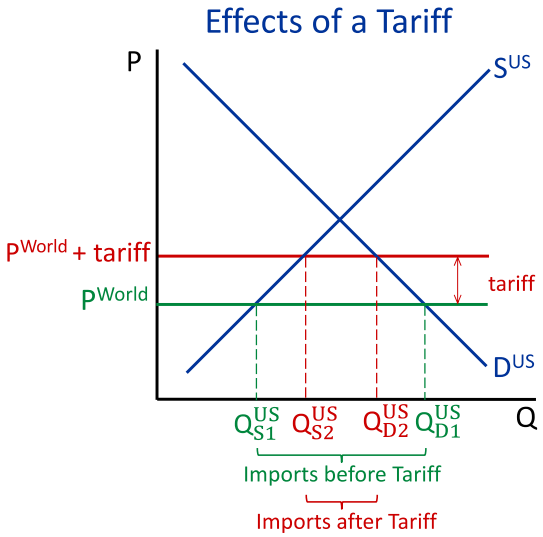



The shift in the reaction function lowers interest in the short-run (point A) as there is inflation inertia (and increases output) and it increases inflation in the long run with no change in interest and output (point B)

**8.** Avocados are a good that the U.S. both produces domestically and imports. Suppose the U.S. puts a tariff on imported avocados.

**a.** What would the imposition of the tariff do to the price of avocados paid by American consumers, the amount of avocados bought by American consumers, and U.S. imports of avocados? Use a diagram to explain your answer **[1.5 points]**

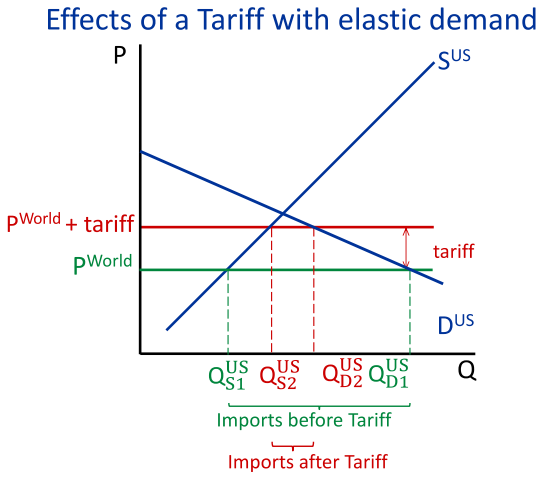
We use the supply and demand diagram with international trade




The tariff on avocados increases the price paid by US consumers. It decreases the amount consumed by US consumers and US imports.

**b.** If the American demand for avocados is highly elastic, will the impact of the tariff on U.S. avocado imports be larger or smaller than if the demand were less elastic? Use a diagram to explain your answer **[1.5 points]**

If US demand is very elastic, the demand curve is relatively flat. The reduction in imports is going to be larger as illustrated below.

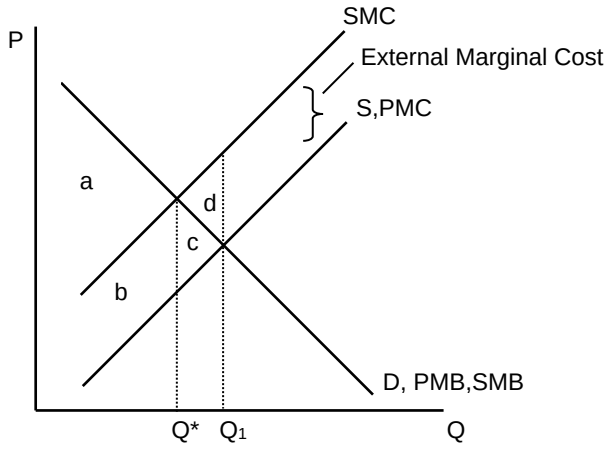



The tariff on avocados increases the price paid by US consumers. It decreases the amount consumed by US consumers and US imports.

**9.** Consider a good that is bought and sold in competitive markets that has a negative externality.

**a.** Show in a supply and demand diagram the amount produced, the socially optimal level of production, and the areas of total private surplus, external costs, and deadweight loss. **[1.5 points]**

Supply and Demand Diagram; Welfare Analysis.

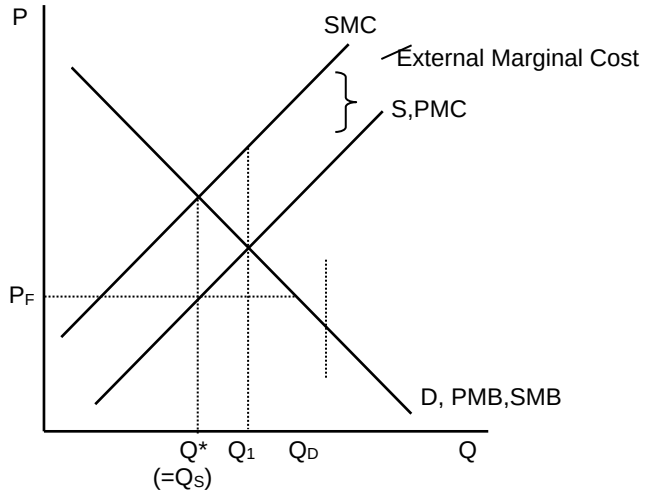



**Important Points:**

- The market produces where S = D (PMC = PMB), which is $Q_1$.
- Socially optimal production is where SMC = SMB, which is Q*.
- Total private surplus: Area between S and D up to quantity produced, which is a + b + c.
- External costs: Area between PMC and SMC up to quantity produced, which is b + c + d.
- Deadweight loss: Shortfall of total surplus from its maximum possible level. Total surplus is a – d. (One way to see this is that it's private surplus minus external costs, which is (a + b + c) – (b + c + d). Another is that it's the area between SMB and SMC up to the quantity produced, and the units from $Q_1$ to Q* yield negative surplus since SMC > SMB for those units.). Maximum possible total surplus is area between SMB and SMC up to socially optimal output, which is area a. So DWL is d.

**b.** Explain how the government could use a price ceiling to cause the quantity produced to equal the socially optimal quantity. Why might this not be a desirable approach to dealing with the negative externality? **[1.5 points]**

Supply and Demand Diagram; Effects of a Price Ceiling




**Important Points:**

- If there is a binding price floor, quantity demanded will exceed quantity supplied, and the quantity bought and sold will equal the quantity supplied.
- If the government sets a price floor at $P_F$ in the diagram, so that the quantity supplied equals Q*, it will cause the quantity produced to equal the socially optimal level.

However QD exceeds QS so that there is rationing of the good. If it is the consumers with highest value for the good who get it, the outcome is efficient. However, if those who get the good are not the highest value consumers, there will be misallocation and hence the outcome will not be fully efficient (in contrast to a tax solution).

**PART IV: MULTIPLE CHOICE** **[10 POINTS TOTAL]**

Each question is worth .5 points. Please write the letter of the ***best*** answer for each multiple choice questions below, like so:

**10. E**
**11. F**
**...**

**10. C**
**11. D**
**12. A**
**13. A**
**14. B**
**15. B**
**16. E**
**17. C**
**18. B**
**19. C**
**20. A**
**21. C**
**22. C**
**23. D**
**24. D**
**25. B**
**26. A**
**27. C**
**28. B**
**29. A**

**10.** If Thailand has a comparative advantage relative to India in producing clothing, this tells us that:
- **a.** the marginal product of a worker in the clothing industry in Thailand is greater than that of a worker in the clothing industry in India.
- **b.** the marginal ***revenue*** product of a worker in the clothing industry in Thailand is greater than that of a worker in the clothing industry in India.
- **c.** Thailand's opportunity cost of producing clothing is lower than India's.
- **d.** Thailand must be subsidizing its clothing industry.
- **e.** (a) and (b).
- **f.** (c) and (d).
- **g.** all of the above.

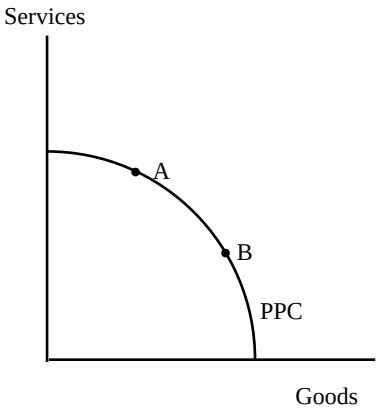
**11.** A drought in blueberry-growing areas will cause:
- **a.** both the price and quantity of blueberries to fall.
- **b.** both the price and quantity of blueberries to rise.
- **c.** the price of blueberries to fall and their quantity to rise.
- **d.** the price of blueberries to rise and their quantity to fall.

**12.** If the ***nominal*** interest rate is zero, the present value of $100 to be received a year from now is:
- **a.** $100.
- **b.** less than $100.
- **c.** more than $100.
- **d.** zero.

**13.** If the marginal propensity to consume is higher, the multiplier is:
- **a.** higher.
- **b.** lower.
- **c.** the same.
- **d.** it is not possible to tell.

**14.** Government subsidies for scientific research are likely to increase output per person in the long run by:
- **a.** increasing planned investment, and so shifting the PAE line in the Keynesian cross diagram up.
- **b.** improving the economy's technology.
- **c.** increasing the economy's normal employment-to-population ratio.
- **d.** increasing net capital inflows.

**Question 15 refers to the diagram to the right, which shows the PPC in terms of military and civilian goods and services.**




**15.** Comparing Points A and B, the opportunity cost of producing 1 extra good is:
- **a.** greater at Point A.
- **b.** greater at Point B.
- **c.** the same at the two points.
- **d.** it is not possible to tell.

**16.** The main reason that when government purchases rise by some amount, GDP rises by more than that amount in the short run is:
- **a.** higher government purchases increase consumer confidence, causing consumption at a given level of disposable income to be higher.
- **b.** increases in government purchases are usually accompanied by tax cuts, which raise consumption at a given level of GDP.
- **c.** higher government purchases raise inflation, and so reduce the real interest rate, which increases consumption and investment at a given level of GDP.
- **d.** all of the above.
- **e.** none of the above.

**17.** Net capital inflows are:
- **a.** American companies' purchases of new physical capital goods minus depreciation of their existing capital.
- **b.** the human capital of new members of the U.S. labor force minus the human capital of individuals who exit the labor force.
- **c.** foreigners' purchases of American assets minus Americans' purchases of foreign assets.
- **d.** U.S. imports of physical capital goods minus U.S. exports of physical capital goods.

**18.** If negative economic profits cause some firms to exit a competitive industry:
- **a.** both the industry supply curve and the supply curve of a typical firm remaining in the industry shift to the left.
- **b.** the industry supply curve shifts to the left, and the supply curve of a typical firm remaining in the industry does not change.
- **c.** the industry supply curve shifts to the left, and the supply curve of a typical firm remaining in the industry shifts to the right.
- **d.** the industry supply curve does not change, and the supply curve of a typical firm remaining in the industry shifts to the left.
- **e.** neither the industry supply curve nor the supply curve of a typical firm remaining in the industry change.

**19.** A competitive firm will produce at the point where:
- **a.** marginal cost is as low as possible.
- **b.** the difference between marginal revenue and marginal cost is as large as possible.
- **c.** marginal cost is equal to the price of the good.
- **d.** marginal revenue is equal to the wage.

**20.** If the Consumer Price Index (CPI) is 200 in 2017 and 206 in 2018, inflation from 2017 to 2018 is:
- **a.** 3%.
- **b.** 6%
- **c.** 206%.
- **d.** 406%
- **e.** it is not possible to tell.

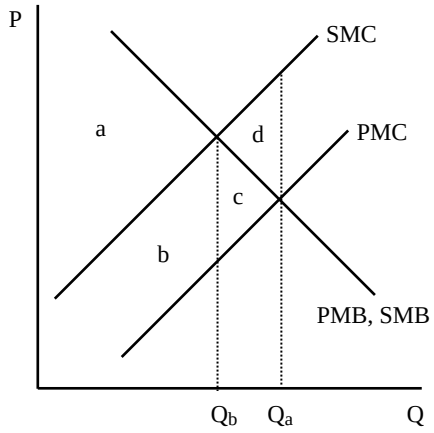
**21.** A fall in the real interest rate:
- **a.** causes the investment demand curve to shift to the left.
- **b.** causes the investment demand curve to shift to the right.
- **c.** causes a movement down along the investment demand curve.
- **d.** causes the purchase price of capital to fall.

**22.** Consider the budget constraint for a consumer choosing between food and clothes. If food is on the vertical axis and clothes are on the horizontal axis, the slope of the budget constraint is:
- **a.** the consumer's income divided by the price of clothes.
- **b.** the consumer's income divided by the price of food.
- **c.** minus the price of clothes divided by the price of food.
- **d.** minus the marginal utility of food divided by the marginal utility of clothes.

**23.** Suppose that in the market for airline pilots, there is a negotiated wage that is above the level where the quantity of labor supplied and the quantity demanded are equal. The following will reduce the normal employment of airline pilots:
- **a.** an increase in the negotiated wage.
- **b.** a fall in labor demand.
- **c.** a fall in labor supply.
- **d.** (a) and (b).
- **e.** (a) and (c).
- **f.** (b) and (c).

**24.** If a monopolist that is producing where marginal revenue equals marginal cost is earning negative economic profits, it will:
- **a.** raise its price.
- **b.** raise the quantity it produces.
- **c.** (a) and (b).
- **d.** exit.
- **e.** the situation described cannot occur.

**Questions 25 and 26 refer to the diagram to the right, which shows the market for a good with a negative externality that is bought and sold in a competitive market.**




**25.** If there is no government intervention, the deadweight loss will be:
- **a.** area c.
- **b.** area d.
- **c.** at least area c, but almost certainly more.
- **d.** at least area d, but almost certainly more.
- **e.** zero.

**26.** If the government imposes a per unit tax, physically collected from the seller, so that the quantity produced is the amount the makes total social surplus as large as possible, government revenue will be:
- **a.** area b.
- **b.** area b + c.
- **c.** area b + c + d.
- **d.** area b + c – d.

**27.** A utility-maximizing household will allocate its spending so that:
- **a.** the total utility it gets from each good is the same.
- **b.** the additional utility it gets from one more unit of each good is the same.
- **c.** the additional utility it gets from spending one more dollar on each good is the same.
- **d.** the average utility it gets per dollar spent is the same for each good.

**28.** The following development will cause both employment and the wage in a labor market to fall:
- **a.** a rightward shift of the labor demand curve.
- **b.** a leftward shift of the labor demand curve.
- **c.** a rightward shift of the labor supply curve.
- **d.** a leftward shift of the labor supply curve.

**29.** Suppose the price elasticity of supply in a competitive market is very high. Then an outward shift of the demand curve will tend to cause:
- **a.** a large rise in quantity and a small rise in price.
- **b.** a small rise in quantity and a large rise in price.
- **c.** a large fall in quantity and a small rise in price.
- **d.** a small fall in quantity and a large rise in price.

## SCRATCH PAPER